OFFICIAL APRIL 2013 UPDATE SUBMISSION TO THE NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION UNDER THE STATE BROADBAND INITIATIVE GRANT PROGRAM FOR THE STATE OF ALASKA

CONNECT ALASKA®

April 1, 2013

TABLE OF CONTENTS

April 1, 2013

Ms. Anne W. Neville
SBI Grant Program Director
National Telecommunications and Information Administration
U.S. Department of Commerce
Room 4716
1401 Constitution Avenue, NW
Washington, DC 20230

Dear Ms. Neville:

As the State Broadband Designated Entity, in partnership with the Alaska Department of Commerce, Community, and Economic Development, please accept this submission from Connected Nation on behalf of the state of Alaska's State Broadband Initiative (SBI) Grant Program, known as Connect Alaska.

Connected Nation and Connect Alaska congratulate the National Telecommunications and Information Administration (NTIA) and the Federal Communications Commission (FCC) on achieving the two-year anniversary of the National Broadband Map. Truly, now more than ever, the significance of complete and validated data through this effort is impacting lives in communities all across our great country. The Connect Alaska program and its collective stakeholder community continue to be faithful and energized contributors and we are proud to play such a part in forging the innovation economy of the twenty-first century.

The items that comprise this submission should be found to be compliant with the April 1, 2013, deadline for the semi-annual data update and in accordance with the terms of the July 1, 2009, Notice of Funds Availability (NOFA) and all subsequent clarifications pertaining to delivery of state-level mapping of broadband service availability. This packet includes:

Inventory of Deliverables, Connect Alaska: April 1, 2013

NOFA Requirement	Data Transfer Model	Data Description
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in Census Blocks of No Greater Than Two Square Miles in Area
Appendix A: 1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road

		Segment in Census Blocks Larger in Area Than Two Square Miles
Appendix A: 1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address
Appendix A: 3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points
Appendix A: 4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing
Appendix A: 4	n/a	Community Anchor Institutions-Narratives
VII.A.1(a)	n/a	Accuracy and Verification Report
n/a	DataPackage.xlsx	Worksheets of Contact Information, Record Count, and Provider Summary Table
n/a	n/a	List of Changes and Corrections to the Dataset
n/a	n/a	Broadband Provider Roster and Participation Status

In addition, this data update submission should be found to be compliant with the additional program requirements instituted by the National Telecommunications and Information Administration since the time of the October 2012 SBI data submission for the Connect Alaska program. Specifically, these new requirements are:

SBI Data Transfer Model
The submission of the broadband dataset for April 1, 2013, is contained within the SBI Data Transfer Model as released on the Grantee Workspace on December 14, 2012. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information on each provider as possible.

Additional Submission Guidance
On February 8, 2013, NTIA released new guidance regarding the processing of wireless data, for both fixed and mobile broadband providers. All wireless provider coverage records have been reviewed and are in compliance with this grantee guidance for this April 2013 submission period. Even providers that did not have an update for this submission cycle were reviewed and data reprocessed as necessary for those records that were not yet in compliance with the new guidance.

This submission continues to follow the speed technology guidance released by the Program Office on August 9, 2012, to review speed tier codes in correspondence with technology of transmission codes. In the October 2012 submission, descriptions were provided in the methodology paper that offered an explanation for any submitted technology of transmission and speed combinations that were outside of the expected value range. That practice continues in this submission as technology and speed combinations are reviewed

and scrutinized; any questionable information supplied by providers is reviewed more in depth with the provider to ensure the information is accurately captured or a proper explanation is provided as to why the speed information should be submitted as supplied even if it falls outside the expected value range.

This April 2013 semi-annual data update under the SBI Grant Program continues to demonstrate our dedication to implementing the joint purposes of the Recovery Act and the Broadband Data Improvement Act (BDIA) by gathering comprehensive and accurate state-level broadband mapping data, developing state-level broadband maps, aiding in the development and maintenance of the National Broadband Map, and undertaking statewide initiatives for broadband planning.

Broadband Service Availability — Provider Outreach and Verification

This data update submission under the SBI program includes datasets for 96.3 percent of the Alaska provider community, or 26 of 27 total providers. Of the 26 participating providers, 13 supplied an update to their network or coverage area(s), while 13 have reported no change. A complete roster by provider depicting participation status and contact history is contained herein. The remaining provider that is not represented in the attached datasets was non-responsive to multiple contact attempts.

As the aforementioned roster and attached methodology documentation will attest, it is the collective opinion of the Connect Alaska principals that all commercially reasonable efforts were made to account for 100 percent of the known Alaska broadband provider community, pursuant to this semi-annual data update submission.

Connect Alaska has also continued to perform broadband verification activities through several means. In addition to confirmation of service area(s) by each provider, Connect Alaska conducts field validation efforts. To date, 19 (70.37 percent) providers have been validated through field verification activities. Additional details on verification activities are contained within the Field Validation Methodology.

The Connect Alaska website, (www.connectak.org), continues to serve a prominent role in the outreach and data collection effort. This program asset provides a way for the general public to participate in the process by offering interactive tools for users to test their connection speed, submit broadband inquiries, or contact a program representative.

As an indicator of stakeholder penetration, the Connect Alaska website encountered 2,036 unique visits during this reporting period (15,083 total to date for the life of the grant awarded on June 1, 2010. Additionally, this pronounced Web activity netted 2 broadband inquiries over this same reporting period (50 grant inception to date). The website also provides access to the My ConnectView™ interactive mapping application, which allows consumers and broadband providers to confirm or dispute the coverage represented on the broadband inventory map. These consumer-initiated actions are facilitated through the Connect Alaska website and the Connect Alaska

interactive mapping tool (My ConnectView™) that offer the stakeholders the vehicles to provide information regarding availability in their respective service area, either in affirmation or contest of the reported data represented in the Connect Alaska mapping artifacts. Since the initial data collection and release of corresponding maps, feedback in the form of broadband inquiries has allowed Connect Alaska to identify additional areas that are in need of field validation, which is scheduled as soon as possible.

Community Anchor Institutions

Connect Alaska continues to make significant inroads to gather data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. This uptick in CAI data collection was further supported by NTIA's outreach to grantees reiterating the importance of this outreach. With the continued commitment of the Alaska Department of Commerce, Community, and Economic Development, we have continued to focus on a relationship-oriented approach with state-level agencies and organizations that generates more responses than general contact.

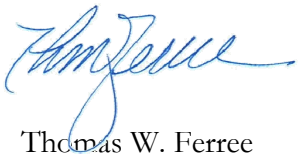
In conjunction with the Alaska Department of Commerce, Community and Economic Development, outreach was conducted during this data update reporting period by Connect Alaska to continue identification of existing, centralized sources for CAI connectivity data. Additionally, outreach was coordinated to distribute the CAI survey to institutions throughout the state through multiple methods including a customized online survey available on the Connect Alaska website. Building on past success of the September 2012 Education Campaign, February 2013 was recognized as Public Safety Month where the public safety sector was the focus of CAI data collection, research, and public affairs outreach. Connect Alaska has developed a number of new relationships with statewide associations such as Anchorage Economic Development Corporation, the North Star Volunteer Fire Department, and multiple local cities and boroughs, to promote the importance of broadband connectivity at anchor institutions and participation in this data collection process. The value of these relationships continues to impact the entire success of the Grant Program, and the CAI engagement is a logical extension of new and existing relationships. Connect Alaska will continue to build upon these new relationships over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

From our work in Alaska, as well as other states, we recognize the great value of this data to future collaboration efforts within the state as well as its value to the National Broadband Map. We plan to continue to bring best practices to the Connect Alaska efforts, along with an investment of both human and technical resources required to reach our goal of increasing the data that is secured and reported as part of this process.

The Connect Alaska program exists to improve data on the deployment and adoption of broadband services and to assist in the extension of broadband technology across all regions of the great state

of Alaska, as well as the United States and its territories through contribution to the National Broadband Map. We look forward to the continuing work ahead and improving upon our data collection methods.

Respectfully submitted,



Thomas W. Ferree
President and Chief Operating Officer
Connected Nation, Inc.

ALASKA COMMUNITY ANCHOR INSTITUTIONS METHODOLOGY

In this seventh reporting period of the SBI, Connect Alaska, working in close coordination with the state of Alaska, has established an ongoing mechanism for gathering data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. Since the October 2012 data submission, the CAI outreach process method has been modified to improve data collection. Specifically, the outreach process is a more focused sector-specific and relationship-oriented approach that generates more responses than general contact.

Connect Alaska has continued to identify and process CAI data obtained through an ongoing statewide outreach campaign. Physical address information continues to be augmented through manual sourcing and geocoded by Connect Alaska through Esri ArcGIS software.

Connect Alaska continues to utilize a customized online survey hosted through SurveyMonkey, with a landing page on the Connect Alaska website that was developed during the first reporting period. This survey, in combination with a customized data-gathering spreadsheet, was distributed on a regular basis to a targeted list of CAI throughout the state as well as organizations and agencies that work closely with the CAI. The distributions were completed with the support of the state client. Connect Alaska will continue to use these data-gathering tools for future targeted outreach efforts throughout the coming months leading up to the next reporting period. These materials are customized to fit the CAI categories as defined in the SBI NOFA.

The survey can be accessed at this link: http://www.surveymonkey.com/s/YD6MFC9.

In addition to the survey, Connect Alaska has developed a number of new relationships with statewide associations such as Anchorage Economic Development Corporation, North Star Volunteer Fire Department, and multiple local cities and boroughs, to promote the importance of broadband connectivity at Community Anchor Institutions and participation in this data collection process. It is apparent that these relationships are beneficial to the entire success of the grant program, and the CAI engagement is a logical extension of new and existing relationships. Connect Alaska will continue to build upon these new relationships over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

In addition to fostering and building relationships with state agencies, associations, and organizations, Connect Alaska has also developed a sector-specific calendar that supports CAI outreach as well as research and communications efforts. This focused approach allows a corporate commitment to capturing CAI data in addition to developing meaningful sector-specific content. Since the October 2012 submission, the sector-specific approach included a month-long public safety campaign in February 2013. During this campaign, Connect Alaska committed to improve relationships with key stakeholders, distribute survey requests to sector representatives, and provide sector-specific education through communications and webinar resources. Outreach to and survey of hospitals, local law enforcement, and fire stations helps build awareness and establishes a centralized database of key connectivity data for planning.
Connect Alaska conducts significant research as part of an ongoing process to identify existing, centralized sources for CAI connectivity data. In tandem with these efforts to identify existing data, Connect Alaska continues to identify key CAI contacts in an effort to distribute and promote the

online survey and raise awareness of the importance of CAI broadband connectivity. Also, when possible, Connect Alaska works with the Alaska Department of Commerce, Community, and Economic Development to identify existing relationships that can support CAI outreach.

Connect Alaska has an ongoing mission to educate CAI throughout the state on the importance of participating in the project. Participation by these institutions will raise awareness about the importance of broadband connectivity and the need to report the requested data for inclusion on the National Broadband Map.

The greatest challenge with collecting CAI data continues to be educating the CAI about the Connect Alaska project as well as self-awareness of their own broadband connectivity (specifically upload and download speeds). Connect Alaska will continue to research key CAI organizations and agency contacts in an effort to raise awareness of this project among CAI. When applicable, Alaska Department of Commerce, Community, and Economic Development will continue to be briefed on the current CAI data and provided information so it can assist with outreach and promotion within the state.

A CAI summary of all processed and submitted data is provided below:

CAI Type	Total	Physical Address	Lat/Long	Technology of Transmission	Download Speed	Upload Speed
K-12 Schools	711	711	711	426	291	280
Libraries	126	126	126	46	44	44
Healthcare	276	276	276	178	175	6
Public Safety	326	326	326	17	16	16
Higher Ed Institutions	20	20	20	8	8	8
Other Government	570	570	570	30	25	24
Other Non-Government	459	459	459	9	9	6
Total	2488	2488	2488	714	568	384

During the coming months, CAI data collection will be supported by regular reporting to the Connect Alaska team. The CAI data is proving an invaluable resource to all components of the Connect Alaska effort. The data identifies potential local champions, sector trends, and opportunities for improvement as well as opportunities to educate CAI not familiar with their current connectivity.

SBI Data Submission Methodology

The submission of the broadband dataset for April 1, 2013, is contained within the SBI Data Transfer Model and additional components as released on the Grantee Workspace on December 14, 2012. Connected Nation (CN) has reviewed all literature that relates to the release and use of this data transfer model and recognizes that it does not replace or dictate how data is stored, processed,

or displayed for the state, as it is meant primarily as a means to transfer the broadband data from all states and territories and populate the National Broadband Map in a seamless fashion.
Connected Nation has complied with the following guidance documents published by NTIA:

- Technical Mapping Guide, as released on the Grantee Workspace on March 24, 2011, was followed to ensure the completeness and validity of the submission through completion steps and checklists, completing the DataPackage spreadsheet, uploading broadband datasets into the Data Transfer Model, and checking the dataset using the SBDD_CheckSubmission receipt process.
- Naming Conventions and Category of End User, as released on the Grantee Workspace on March 26, 2012, was followed to ensure the consistency of individual file and zip package naming.
- Wireless Data Processing Guidance, as sent to SBI grantees on February 8, 2013, was followed to ensure that all fixed and mobile wireless provider coverage records are submitted to NTIA as separate, closed polygons whenever there is a variation in any of the required fields.

In addition to the methodologies contained herein, the Changes and Corrections documentation, as well as the DataPackage.xls containing contact information, the data dictionary, and a provider summary table, the following feature classes are submitted within the SBI Data Transfer Model for the state of Alaska.

Inventory of Deliverables, Connect Alaska: April 1, 2013

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Appendix A: 1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census Blocks Larger in Area Than Two Square Miles.
Appendix A: 1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address.
Appendix A: 3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points.
Appendix A: 4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing.

The provider data collected by CN on behalf of the state of Alaska have been formatted per the given specifications and uploaded into the appropriate feature classes of the SBI Data Transfer Model. Wireline availability is contained within census blocks and road segments, wireless availability is contained as polygons of coverage areas, and middle-mile connections and Community Anchor Institutions are contained as point data. All speed data is contained at the census block, road

segment, or wireless polygon level of availability. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information as possible.

Connected Nation has continued outreach to satellite providers on their availability, technology, and speed information, but granular coverage is not yet available. Submitted within the wireless feature class are the satellite companies providing service to Alaska as a polygon of the state boundary. Efforts will continue to collect, process, or otherwise create more granular satellite data based on availability analyses and guidance received from NTIA. Process development continues as well to be able to create more granular satellite coverage based on satellite equipment positioning and geographic inputs.

DATASETS FOR IN-KIND MATCH

Connect Alaska received an Alaska Statewide Digital Mapping Initiative Orthoimagery dataset from the Alaska Department of Natural Resources as part of an in-kind match contribution to assist Connect Alaska with its mapping and planning goals - $177,933 in-kind match contribution.
The Department of Education and Early Childhood Development provided the Connect Alaska mapping initiative a school district speed test dataset as part of an in-kind match contribution to assist with its mapping and planning goals - $5,000 in-kind match contribution.

ALASKA FIELD VALIDATION METHODOLOGY

CN focused a portion of its time on specific validation processes such as:

- conducting random spectrum analysis studies throughout the state using an Avcom PSA-37-XP spectrum analyzer;
- conducting mobile speed tests throughout the state using an iPhone, Android (or other smart phone) as well as provider-specific aircards (Sprint 3G/4G, Clearwire et al);
- identifying pre-selected, provider-submitted wireless transmit tower sites and cross-referencing data about that tower against the Federal Communications Commission (FCC) databases such as Antenna Structure Registration and/or the Universal Licensing System;
- cross-referencing Federal Registration Number data against available FCC Form 477 data as well as the FCC **CO**mmission **RE**gistration **S**ystem (CORES);
- validating provider submitted data (for example: latitude/longitude) using a handheld Garmin eTrex Summit GPS unit or GPS enabled software such as Microsoft *Streets & Trips*;
- locating physical wire-line attributes (such as Central Offices, Remote Terminals, CATV plant, etc.) and comparing them against provider submitted data; and
- conducting on-net and off-net speed tests using the FCC portal at http://www.broadband.gov/qualitytest/about/ or using the Ookla Net Metrics enabled speed test utility located on each of CN's program specific websites.

Additionally, CN cross-referenced numerous public documents in order to ensure that all known broadband providers were located and contacted. This included searching membership logs from trade associations (WISPA, WCAI, PCIA, etc.), the Cable Television Fact Book, Public Utility Commission records, Public Service Commission records, Chamber of Commerce, etc.

To date, Connected Nation's staff has conducted on-site validation tests in Alaska on the following providers: Ace Tekk Wireless Internet; AlasConnect, Inc.; Alaska Communications Systems Holdings, Inc. (d.b.a. ACS); Alaska Power and Telephone Company; American Broadband Communications (d.b.a. TelAlaska Long Distance Inc.), AT&T, Inc.; Borealis Broadband; Clearwire Corporation; Copper Valley Telephone Cooperative, Inc.; Cordova Telephone Cooperative, Inc.; Craig Cable, Futaris (formerly d.b.a. atContact Communications); GCI Internet; Hughes.net; Ketchikan Public Utilities; Matanuska Telephone Association; SPITwSPOTS LLC; Verizon Wireless; and Yukon Telephone Company.

From program initiation through this reporting period, CN has completed field validation testing against 19 companies (out of a universe of 27 viable providers) totaling 70.37 percent within the state of Alaska.

CN has also continued to review provider datasets for accurate speed information, platform listings, and other intricacies that may fall outside of the standard SBI Data Transfer Model parameters, as published on the NTIA Grantee Workspace on December 14, 2012. Any providers whose submitted coverage and attributes are anticipated to come into question have been further reviewed and confirmed; details on a case-by-case basis are presented below.

SPITwSPOTS LLC
Issue: Fixed wireless platform with maximum advertised download speed in tier 8, as well as maximum advertised upload speed in tier 8, higher than expected value range for the technology.
Resolution: Provider website advertises 25 Mbps service; screenshot below. Provider confirmed that service is symmetrical, so the 25 Mbps service advertised is for both download and upload speeds.

PROVIDER VALIDATION METHODOLOGY

Broadband providers maintain their service area data in many different formats, all in varying levels of complexity and granularity. In order to ensure that the data required by the NTIA is standardized across all providers and that it is as accurate as possible, CN translates and formats the data that providers are able to supply into a GIS shapefile and produces maps for the provider to review. The resulting map(s) and review process allow for providers to see their service area in a geographic

format – for some providers, this is the first time they have seen maps of their broadband service area. Having the mapped service area allows providers to quickly identify any issues that appear in the data representation, whether the issue is in the data translation into a GIS format or from the original data collection and submission. Often data is provided from various sources and through the review and revision process, local engineers who operate the networks and work in the field are able to ensure that the tabular data that has been submitted is accurate and represents the real-world network extent. Any issues in how the service area is represented on the map(s) are remedied by CN, whether they are additions, removal of service, or any other revisions. Revised maps of service area representations are sent to the provider for review and approval; CN will revise data and return maps as many times as necessary until the provider is in agreement that the map represents their service area as accurately as possible. Once the review process has been completed and final approval of the data is provided, the data is deemed ready for NTIA submission.

Once the data collection has been aggregated at a statewide level, static maps of statewide and borough-level availability are produced and made publicly available. In addition, consumers can visit the interactive online tool, My ConnectView, to create customized views of broadband service areas and analyze corresponding demographic information. Leveraging broadband service data on various platforms allows for public users, providers, and other stakeholders to review, scrutinize, and provide feedback on the represented data. This feedback becomes a validation method in itself, as consumers submit inquiries to CN either affirming where service is not available or identifying areas where broadband service is shown on the map, but in actuality is not available. This allows for a follow-up to providers regarding revisions to the data as it is represented; it also allows for CN to identify locations where on-site visits may be necessary to complete field validation of available services. Public feedback on all forms of mapping products serves as a localized validation method for provider-supplied information and allows CN to resolve inaccuracies as they are identified to ensure that only the highest quality information is provided to stakeholders.

Estimates derived from provider-validated data indicate that approximately 6.03 percent of Alaska households do not have terrestrial fixed broadband service available, and approximately 4 percent of Alaska households have neither mobile nor fixed broadband service available.

Within rural areas of the state, results derived from provider-validated data indicate that approximately 11.72 percent of rural Alaska households do not have terrestrial fixed broadband service available, and approximately 8.05 percent of rural Alaska households have neither mobile nor fixed broadband service available. Please note that the availability estimates presented are based on Census 2010 household information.

The estimates above, in accordance with NTIA's definition of available broadband service as specified in the SBI NOFA, include broadband service with download speeds of at least 768 Kbps and upload speeds greater than 200 Kbps.

In addition, due to the nature of the SBI data collection methodology as defined by the NTIA and based on both census block geographic units and street segment data, the estimates of broadband availability derived from provider-validated data may include an overstatement of the actual number of households with broadband availability. Under the census block-based data collection method, a provider will typically report broadband availability for an entire census block whether its network is

present across the whole or only a subset of that census block. This potential overestimation at the census block level can be amplified as the data is aggregated across the entire state.

WIRELESS METHODOLOGY

Broadband Service Availability in Provider's Service Area
Wireless Services Not Provided to a Specific Address

Data solicited from a fixed wireless provider to create propagation models include, but are not limited to:

1. The name of the structure.
2. Whether the transmitting device is operational or proposed.
3. The maximum advertised downstream speed, the maximum advertised upstream speed.
4. The typical downstream speed, the typical upstream speed (peak periods for both).
5. The frequency range of spectrum being used (as prescribed by NTIA). This may include (but is not limited to) spectrum authorizations identified within the Federal Communications Commission (FCC) Universal Licensing System (ULS) database or located on the FCC's Spectrum Dashboard.
6. The primary population center(s) being served (for geopolitical boundary reference).
7. The physical address of the transmit site (in the event latitude/longitude is unavailable from the provider this allows a quick reference point for geocoding).
8. Latitude in either Degrees, Minutes, and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
9. Longitude in either Degrees, Minutes and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
10. Antenna pattern (e.g. omnidirectional, 180°, 120°, 90°, etc.).
11. Azimuth of antenna (e.g. 360° with magnetic declination if known).
12. Approximate transmit radius (in feet, miles, or kilometers).
13. Polarity of transmit antenna (Vertical or Horizontal).
14. Transmit antenna gain (in dBi).
15. Line loss (applicable only to providers using coax, heliax, waveguide or other forms of cabling – excludes power-over-Ethernet devices).
16. Mechanical and/or Electrical beam tilt (if applicable).
17. Equipment Manufacturer (allows easy cross-reference against manufacturer's specification sheet).
18. Power output of the transmitting device (if unknown, FCC standards or manufacturer specifications are applied).
19. AMSL at base of tower site.
20. Antenna centerline AGL (height of antenna above ground level measured at the centerline of the actual antenna).

21. Foliage factors (Evergreens/Deciduous and percent of ground cover).
22. Ground Clutter (primarily used in rural areas to account for foliage and in metropolitan areas to account for types and heights of buildings if known).
23. Average gain of receive antenna.
24. Receive antenna is estimated at height above average terrain (HAAT) of 6.2 meters/20 feet.
25. Federal Registration Numbers (if applicable) which may allow opportunities to cross-reference and/or obtain additional data from the FCC's ULS and the **CO**mmission **RE**gistration **S**ystem.

Propagation modeling combines scientific data and empirical mathematical formulation for the characterization of radio wave propagation as a function of frequency, distance, and other conditions. Propagation software(s) typically use the Irregular Terrain Model (also known as Longley-Rice) of radio propagation for frequencies between 20 MHz and 20 GHz. This model is based on electromagnetic theory and statistical analyses of the combination of terrain features and radio measurements, then predicting the median attenuation of a radio signal as a function of distance and the variability of the signal in time and in space. For metropolitan areas, the software can typically be adjusted to use the Okumura-Hata model, which accounts for predicting the behavior of cellular transmissions in areas where buildings are the primary obstructions. The resulting product from either model depicts a graphical illustration of the theoretical propagation characteristics of a selected frequency range based on defined variables (receiver sensitivity of the home/mobile device, foliage factor, and digital elevation terrain input).

After converting propagation models into a geospatial format, additional processing is completed to remove the small pixels representing service present in the resulting dataset. These areas are initially created based on the parameters entered in the software from the provider equipment information, the underlying data parameters of elevation, hill shade, etc., and the limitations of the software itself to display a broadband service area as accurately as possible. Generally, these random pixel striations appear as a result of signal levels reaching the highest elevated points within the prescribed radius. Typically, while this pixilation anomaly shows legitimate areas where signals can be received, these highly elevated points may have exceedingly sparse populations or are entirely void of population. As a result, and congruent to the *Wireless Technology Methodologies and Business Logic* white paper submitted to NTIA on January 20, 2011, all independent pixels representing service that are less than 0.125 square miles in area have been removed from the geospatial representation of each wireless provider.

BROADBAND INQUIRIES METHODOLOGY

CN collects consumer feedback in the form of broadband inquiries (BBIs). These inquiries represent any type of communication received from the public regarding broadband service. Once BBIs are received across the state, this information is overlaid with the broadband availability information which was collected through the SBI program. This allows for a real-world comparison of the broadband landscape to the information received from broadband inquiries. Consumers submitting

these inbound comments and/or inquiries are able to provide information regarding five categories: 1) residents who do not have broadband but want it; 2) residents who have broadband but want a different provider; 3) residents who do not have broadband, but the broadband inventory maps indicate that they do; 4) residents who have broadband but want a faster connection speed; and 5) residents who have broadband but want a less expensive service option.

BBIs are submitted frequently by consumers via the Connect Alaska website. Inquiries often seek help to identify local broadband provider options, or to learn when a specific provider may be able to provide service to that consumer. Consumer comments also provide information which may help modify maps with actual service area information. The primary objectives of CN regarding these inquiries are 1) to improve the accuracy of the state maps with submitted consumer information and follow-up field research; 2) to provide broadband options to consumers through cooperation with mapped providers and by facilitating new broadband service options; and 3) to map and analyze information from consumers about areas of unmet broadband demand and alternatives to currently mapped services. A prime example of the second option is the utilization of the Rural Utility Service satellite eligibility tool. By simply entering the consumer's address, the CN engineer can quickly determine if the consumer meets the initial qualification status for BIP satellite subsidies.

New BBIs are assigned to either the GIS department or the Engineering & Technical Services (ETS) team depending on the category entered by the consumer on the website submission form. The GIS or ETS team members respond to each inquiry according to the information entered by the consumer. Many BBIs can be resolved through desktop research; however, if a BBI requires research in the field, the assigned ETS team member conducts such research when performing field validations in the area of the inquiry, or at another such time as is practical and appropriate. GIS and ETS team members respond to and conclude BBIs via telephone contact and/or e-mail communication.

The broadband inquiry process has been implemented in each of the CN state programs with successful results. Altogether CN has received over 18,839 broadband inquiries since 2007, allowing the state programs to evaluate each inquiry for broadband demand and data verification. These inquiries are continuously examined against current broadband availability, updated every six months, to determine if previously unserved households have been expanded to and can now receive broadband at their residence. This database of broadband inquiries has also allowed the CN state programs to aggregate demand in concentrated areas to show providers the exact locations where the population has made it clear that they would purchase broadband if it was made available to them. Providers in the states have responded to this process and have expanded to areas knowing that their investment will be worthwhile. Data verification methods have also proven successful, as the state programs have been able to show those inquiries that indicate the broadband service areas are misrepresented on the map to providers, who then verify where service cannot reach in regard to that residence(s). The broadband coverage in these states has been altered to create a more accurate map based on the inquiries submitted by the public.

During this reporting period, the Connect Alaska project has received a total of 2 inquiries (50 grant inception to date). As more inquiries are submitted to Connect Alaska, a more thorough validation of the broadband landscape can be performed, while also allowing providers to see which areas have a high demand for broadband adoption.

MY CONNECTVIEW METHODOLOGY

My ConnectView is an interactive online mapping tool for viewing, analyzing, and validating broadband data. Developed using Esri's ArcGIS for Server and Adobe's Flex Framework and hosted and maintained by Connected Nation, My ConnectView is a multi-functional, user-friendly way for local leaders, policymakers, consumers, and technology providers to devise a plan for the expansion and adoption of broadband.

First and foremost, My ConnectView allows consumers to locate their residence and identify providers that offer broadband Internet service to that location. The interactive platform allows for users to build and evaluate broadband expansion scenarios using a wealth of data, including several coverage analysis layers, speed analyses, Community Anchor Institutions, and tools to search and export household demographic information, as well as extract data in GIS, spreadsheet, and/or PDF formats.

My ConnectView also features more interactive data layers and additional tools than ever before to allow the consumer to explore the broadband data. My ConnectView provides consumers with the ability to print, e-mail, and provide feedback on the broadband data displayed on the interactive map. Through the collection of this feedback, a visual demand for broadband is presented. This visualization allows the CN state programs the ability to validate the broadband availability for accuracy. If residents within a region state they are without broadband, but the interactive map shows otherwise, this allows CN to approach the providers within that area in an effort to trim down their coverage to more accurately represent real-world availability on the ground.

The Connect Alaska project launched My ConnectView on April 2, 2012, and has received 582 visits this reporting period; to date the interactive mapping application has received 2,582 visits.

SPEED TEST METHODOLOGY

The 240 speed tests that are represented in the Connect Alaska Speed Test Report during this reporting period (2,642 grant inception to date) are the result of a partnership between CN and Ookla Net Metrics. Utilizing this relationship increases the level of confidence in the data being collected and provides for a far greater sample size than could be collected by a single testing site.

Ookla owns and operates Speedtest.net, as well as develops and deploys speed tests, such as the Connect Alaska speed test website, for partners around the world. This network of sites that is developed and run on its testing technology provides Ookla with a vast dataset that, due to the variability of geographic information collected across the varying speed test sites, is geocoded

utilizing Geo-IP technology. This technology allows for tests to be geocoded to points of aggregation, typically larger nodes across provider networks. While there are hundreds of thousands of tests that have been conducted, the level of aggregation is only sufficient for borough-level detail due to the test results being located at these larger nodes and not at an absolute location for each speed test.

In an effort to validate broadband data from the Connect Alaska project, speed test information is collected throughout the state. Speed tests provide speed information on the path taken through all networks (a provider's network as well as additional networks) a local machine must connect to in order to reach the host test. The benefit of this collection of speed information is two-tiered. First, it allows for a comprehensive dataset of speeds, while also providing Connect Alaska with the information on where broadband services are available. Second, unlike theoretical speed information which may be received through the data collection process, the use of speed tests provide real-world information on the speeds that currently exist within the state of Alaska.

PROVIDERS DEEMED NON-VIABLE

The following list of companies represents the remainder of the broadband provider universe that was originally identified as complete for outreach to begin for the State Broadband Initiative. These providers are not included in the Data Package for the April 2013 submission because they have been deemed non-eligible under the parameters and guidance of the SBI grant program. This list of companies includes, but is not limited to: providers offering service but below the current definition of broadband, those that have gone out of business, technology consulting firms, infrastructure or network construction companies, non-facilities based general resellers, etc.

	Company Name	URL	Comments
1	650Net	http://www.650net.net	Website references emergency food items.
2	AAA Internet Service	http://aaainter.net/dsl	Dial-up service with nonfacilities-based DSL. Does not offer in Alaska on searches.
3	Access123.net	http://www.access123.net	Not a broadband provider; website directs to adult content.
4	ACERX.NET	http://acerx.net	Nonfacilities-based reseller of 13 national companies with cable, DSL, and mobile wireless applications.
5	Airewaves Broadband, LLC	www.airewaves.com	Airewaves website is an audio-based web service.
6	Alaska Wireless Cable	n/a	Provider is no longer in business; URL is inactive.

7	Alaska Wireless Systems	n/a	Provider is no longer in business; URL is inactive.
8	Angoon Cablevision	n/a	Provider is no longer in business; URL is inactive.
9	Broadband National	http://www.broadbandnational.com	Nonfacilities-based reseller of 30 national companies with cable and DSL applications.
10	Bush-Tell Inc.	n/a	Per CSR, they are local exchange services only; no website.
11	Camino-Net Internet Services	http://www.camino-net.com	No longer in business; phone and website are both inactive.
12	Circle Telephone Co.	n/a	Per CSR, they are local exchange services only; no website.
13	Communications Unlimited	http://www.cuicable.com/	Communications services company; does not provide broadband.
14	Core Communications	http://www.corecomm.us/	Printer and visual communications supplier.
15	deluxehost.com	http://deluxe-host.com	Company delivers web hosting services.
16	Denali Wireless Television	http://www.denalitelevision.com/	Nonfacilities-based web engine reseller for multiple companies.
17	DGUI	http://www.dgui.com/	No longer in business; phone and website are both inactive.
18	Dialer.net	www.dialer.net	England-based, international pay-as-you-go mobile wireless and hot spot reseller.
19	DTS-NET.COM	http://www.dts-net.com/	Non-facilities based reseller.
20	Echostar	http://www.echostar.com/	Does not provide service in Alaska.
21	Eyecom Cable	www.telalaska.com	Subsidiary company of Tel Alaska and Eyecom; does not provide broadband service.
22	Freedom Internet	http://freedominternet.net/	Dial-up services only.
23	Haines Cable TV	http://www.hainescable.com/	Company offers cable TV services only.
24	High Frequency Wireless	http://www.hfwireless.com/	Company is a reseller of GCI services and Clearwire and is an electronics repair depot.
25	Hoonah.Net	n/a	Information located on company is not viable; phone number inactive.

26	ICE Communications	http://www.ice-com.net	Information located on company is not viable; phone number inactive.
27	Imbris, Inc.	http://www.imbris.com	Foreign website should be removed.
28	IMGISP.NET	http://www.imgisp.net/	Could not locate any information on company.
29	Incredible Networks	n/a	Could not locate any information on company.
30	Interactiveinfo.com Inc.	http://interactiveinfoservice.com/	Performs internet search services.
31	iRadical	n/a	Could not locate any information on company.
32	ISPartner.net	n/a	Could not locate any information on company.
33	LCSisp.com	http://www.lcsisp.com/index.cfm	Could not locate any information on company.
34	Level 3 Communications, LLC	www.level3.com	Does not provide service in Alaska.
35	Lou's TV & Satellite Service, Inc.	http://www.lousatellite.biz/	Reseller of Wild Blue services.
36	MainBoard	http://www.mainboard.cc/internet.htm	Offer dial-up and a nonfacilities-based reseller of DSL, cable, and wireless.
37	Maine Cable and Wireless	http://www.mainecableandwireless.com	Could not locate any information on company.
38	Marcin Company	n/a	Could not locate any information on company.
39	MCI Communications Services, Inc.	http://www22.verizon.com/	Acquired by Verizon Communications, Inc. However no services available in Alaska.
40	Microcom	http://www.microcom.tv/	Reseller of Hughesnet, Starband, and Spacenet.
41	Millenicom Inc.	http://www.millenicom.com	Reseller of 3G and 4G mobile wireless services.
42	Mitkof.net	n/a	Information located on company is not viable; phone number inactive.
43	Nanomega.Com	www.nanomega.com	Information located on company is not viable; phone number and URL inactive.
44	NetAccess, Inc.	http://www.nas.net/	Canada business only provider with an array of services.

45	NetSpeed Online	http://www.netspeed-online.net	Could not locate any information on company.
46	Nook Net	n/a	Information located on company is not viable; phone number inactive.
47	Overarch Broadband	http://www.overarch.com	Provider does not offer service in Alaska; provides services in Treasure Valley, Idaho.
48	Pacific Internet Exchange	http://www.pie.us/	Provider is a web hosting company.
49	PremoWeb	http://www.premoweb.com/about_us/contact_us.html	Dial-up services only.
50	Qwest Communications Company, LLC	www.qwest.com/	Provider acquired by CenturyLink. CenturyLink does not provided service in Alaska.
51	Sea Lion International, LLC	http://www.sealioncompanies.com	Provider funding was rescinded and there are no plans for project SABRE going forward.
52	Simply Dialup A Metrogeek Company	http://www.simplydialup.com	Dial-up services only.
53	Skagway Cable TV	www.hainescable.com	Cable TV services only.
54	SkyFrames	http://www.skyframes.com	Information located on company is not viable; phone number and URL inactive.
55	Smith Cable Systems	n/a	Company is a contractor for the installation of cable; no ISP operations.
56	Surferz.Net	http://www.surferz.net	Website manager and developer.
57	The Summit Telephone and Telegraph Company of Alaska, Inc.	n/a	Provider does not meet the broadband speed requirements in either upload or download.
58	Total Access Networks, Inc.	http://www.totalaccess.net	Supplies in-home solutions for multiple types of home networking and other types of services.
59	TransAria	http://www.transaria.net	Website points to backhaul provider, Cutthroat Communications which recently sold to Blackfoot Telecommunications group which serves Montana.
60	TSISP.NET	www.tsisp.net	Information located on company is not viable; phone number inactive.
61	University Corporation for Advanced Internet Development	n/a	Nationwide GBit network for anchor institutions; network under testing and construction; no website found.

62	VPM Global Internet Services, Inc.	http://www.vpm.com	Reseller of HughesNet services.
63	Wireless Roanoke, Inc.	http://www.wirelessroanoke.com	Information located on company is not viable; phone number and URL inactive.
64	wisbin	http://www.wisbin.com	Reseller of DSL Internet service in Wisconsin; does not serve Alaska.
65	www.AmericanAngel.us	http://www.americanangel.us	Information located on company is not viable; website is a social website.
66	YEYZOO.NET	http://t1.vedy.net	Provider is a nonfacilities-based reseller of backhaul.
67	YLISP (Your Local ISP)	http://www.itsyournet.com	Website hosting and development services.

APPENDIX A: BROADBAND PROVIDER LOG

Broadband Provider Log

Complete	41
Non-Responsive/Refused	1
In Progress	0
Reseller Providing Data	0
Count of Datasets by Status	**42**
Total Unique Providers Represented	**27**

Provider Name	Platform	Status	NDA Execution Date	Notes
Alaska Communications Systems Holding, Inc. (ACS)	Mobile Wireless	Data Added to Statewide Inventory	6/2/2011	[FEB-20-13 Brian Dudek] Change: Provider added 4G network around Anchorage, Fairbanks and Juneau. Slight expansion of 3G; most noticeably around Kodiak.
AT&T Corp, Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/16/2009	[FEB-25-13 Brian Dudek] Change/Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission. There is notable expansion around Healy, Ninilchik, Prudhoe Bay, and west of Fairbanks. Also added 4G services in the Anchorage area.
Bristol Bay Telephone Cooperative, Inc.	DSL	Data Added to Statewide Inventory		[FEB-26-13 Brian Dudek] Correction: New provider platform for April 2013 submission in which the provider previously did not meet speed requirements.
Copper Valley Telephone Cooperative, Inc.	DSL	Data Added to Statewide Inventory	1/11/2010	[MAR-07-13 Brian Dudek] Change/Correction: Provider changed and corrected their coverage along with their speeds across entire coverage area. These values are based on distance from CO or RT. Additional RT's added.
Cordova Telephone Cooperative, Inc.	Fixed Wireless	Data Added to Statewide Inventory		[FEB-06-13 Brian Dudek] Change: New provider platform for April 2013 submission.
Cordova Telephone Cooperative, Inc.	Mobile Wireless	Data Added to Statewide Inventory		[FEB-06-13 Brian Dudek] Change: New provider platform for April 2013 submission that previously did not reach broadband speeds.
GCI Internet	Cable	Data Added to Statewide Inventory	2/25/2010	[FEB-28-13 Brian Dudek] Change/Correction: Provider expanded cable territory into Kotzebue and some other areas. Upgraded infrastructure in the Anchorage area and now offers max advertised speed of tier 9 download and tier 5 upload. Reduced Petersburg coverage.
GCI Internet	Fixed Wireless	Data Added to Statewide Inventory	2/25/2010	[FEB-27-13 Brian Dudek] Change/Correction: Majority of Terra SW communities now online. Additionally, refined propagations of communities that were submitted previously.
Matanuska Telephone Association, Inc.	DSL	Data Added to Statewide Inventory	6/15/2010	[JAN-08-13 Brian Dudek] Change: Provider expanded DSL territory in southern Point Mackenzie CDP. Increased max advertised download speed to tier 7 in south Buffalo Soapstone CDP.
Nushagak Electric & Telephone Cooperative Inc.	Cable	Data Added to Statewide Inventory		[FEB-26-13 Brian Dudek] Change: New provider for April 2013 submission in which the provider previously did not meet broadband speeds.
Nushagak Electric & Telephone Cooperative Inc.	DSL	Data Added to Statewide Inventory		[FEB-26-13 Brian Dudek] Change: New provider for April 2013 submission in which the provider previously did not meet broadband speeds.
Skycasters	Satellite	Data Added to Statewide Inventory	10/16/2012	[OCT-29-12 Brian Dudek] Correction: Initial submission of provider's coverage, but they were in service previously.
Alaska Communications Systems Holding, Inc. (ACS)	Backhaul	Backhaul Provider Only Processing Complete	6/2/2011	
Futaris Inc.	Backhaul	Backhaul Provider Only Processing Complete		
Ace Tekk Wireless Internet	Fixed Wireless	Speed Only Update; Data Processing Complete		[JAN-28-13 Brian Dudek] Change: Provider upgraded infrastructure and increased max advertised download and upload speeds to tier 4.

Copper Valley Telephone Cooperative, Inc.	Mobile Wireless	Speed Only Update; Data Processing Complete	1/11/2010	[JAN-18-13 Brian Dudek] Change: Provider upgraded infrastructure and increased download speeds throughout service area. Upload speeds increased in majority of service area.
Cordova Telephone Cooperative, Inc.	DSL	Speed Only Update; Data Processing Complete		[FEB-05-13 Brian Dudek] Change: Provider upgraded infrastructure and increased max advertised download and upload speeds to tier 6.
Hughes Network Systems, LLC	Satellite	Speed Only Update; Data Processing Complete	2/5/2010	[MAR-06-13 Brian Dudek] Change: Provider upgraded infrastructure and increased max advertised satellite speeds to tier 7 download and tier 4 upload.
OTZ Telephone Cooperative, Inc.	DSL	Speed Only Update; Data Processing Complete		[FEB-13-13 Brian Dudek] Change: Provider upgraded infrastructure and increased max advertised download speed to tier 4.
Adak Eagle Enterprises, LLC	DSL	No Update to Provide	12/22/2009	
Adak Eagle Enterprises, LLC	Mobile Wireless	No Update to Provide	12/22/2009	
AlasConnect, Inc.	Fixed Wireless	No Update to Provide		
Alaska Communications Systems Holding, Inc. (ACS)	DSL	No Update to Provide	6/2/2011	
Alaska Power & Telephone, Inc.	DSL	No Update to Provide	2/26/2010	
Alaska Power & Telephone, Inc.	Fixed Wireless	No Update to Provide	2/26/2010	
American Broadband Communications	DSL	No Update to Provide	6/7/2010	
Borealis Broadband Inc.	Backhaul	No Update to Provide	2/1/2010	
Borealis Broadband Inc.	Fixed Wireless	No Update to Provide	2/1/2010	
Clearwire Corporation	Fixed Wireless	No Update to Provide	3/3/2010	
Craig Cable TV, Inc.	Cable	No Update to Provide	7/27/2010	
GCI Internet	Backhaul	No Update to Provide	2/25/2010	
GCI Internet	Mobile Wireless	No Update to Provide	2/25/2010	
Ketchikan Public Utilities	DSL	No Update to Provide	1/8/2010	
Ketchikan Public Utilities	Fiber	No Update to Provide	1/8/2010	
Ketchikan Public Utilities	Fixed Wireless	No Update to Provide	1/8/2010	
Kodiak Kenai Cable Company	Backhaul	No Update to Provide	2/7/2011	
Spacenet, Inc.	Satellite	No Update to Provide		
SPITwSPOTS LLC	Fixed Wireless	No Update to Provide		
ViaSat, Inc.	Satellite	No Update to Provide	1/8/2010	
Yukon Tech Inc	Fixed Wireless	No Update to Provide	6/23/2010	
Yukon Tech Inc	Cable	No Update Provided – Use Last Submission Data	6/23/2010	
Arctic Slope Tel. Assn. Coop. Inc.	DSL	Non-Responsive to Multiple Attempts		In addition to multiple contact attempts made during a previous mapping submission period, 7 contact attempts were made this period.

State Broadband Initiative Mapping Methodology

For the State of Alabama
Revised March 31, 2013

CostQuest Associates

LinkAMERICA Alliance

Contents

Overview

This document provides an overview of how the seventh required data set was collected and processed for the State Broadband Initiative (SBI) in the state of Alabama.

This submission builds upon prior efforts to increase in-state broadband mapping and planning capacity. Although each state has taken a slightly different path to building in house capacity, this cross-state partnership helps the LinkAMERICA team focus on comparable outcomes across the four states, where appropriate and support each state based upon the State's elected transition path. Our intent is not to make the states look and be the same, rather it is to leverage economies of scope and scale among the business processes while at the same time pursuing the longer term goal of transitioning sustainable program leadership to the respective states.

Work continues to shift to state partners. Much of this focuses upon the capacity building, planning and technical assistance components of the program. One immediate result of this is that in some of our states in-State partners have taken direct responsibility for the survey, validation and development of Community Anchor Institution information. The methods by which CAI data were developed are included as Appendix One. During this fourth program year we have one in State partner taking over the state web presence, both in terms of content and hosting. We also have States hiring in dedicated resources to support the program.

As expected, this document rests heavily on the prior drafts but has also been updated and expanded.

Significant changes include additions covering:

1. Trends in provider inputs
2. Modification to internal provider tracking
3. Increases in the amount of WISP coverage using propagation estimates or coverage obtained from Towercoverage.com
4. Requested changes based upon NTIA guidance
    a. Review of submitted speed with respect to NTIA supplied frequency table
    b. Review of NTIA speed guidelines, coverage processing and provider documentation
    c. Inclusion of Provider Universe Table (Appendix 4)
    d. Expansion of verification methods summary table
5. Transition planning with respect to capacity building within the State for Broadband map development (even while the technical data development components of the program continue to rest with CostQuest and the LinkAMERICA Alliance).

Treatment of the following subjects has been expanded:

1. Verification and validation
2. Data production methods

3. Provider advertised speed and coverage validation

As anticipated, the SBI program continues to mature and evolve. Technical leadership and strong program office guidance has been appreciated. We continue to focus resources on establishing stable business processes to track submissions, verify received and processed data, test for temporal stability and provide reporting deliverables consistent with NTIA expectations.

In our view, the mapping deliverable reflects (1) a good faith effort, which results in a reasoned response to the NOFA, Technical Appendix A, as well as supplementary program office guidance and modifications offered in phone calls, emails, and webinars, (2) a stable foundation for improvement and prioritization of both NTIA and state needs and interests , (3) a valid data processing model to support online mapping, consumer feedback, provider verification and reporting, and finally, (4) a valid use of the evolving data transfer model and its intrinsic validation methods. More importantly, the resulting data and online coverage maps that follow from this work are providing good input and context for the Broadband planning teams working across the states we have the pleasure to serve.

We also note that the mapping deliverable is increasingly important to state and federal policy makers as each assesses the policy ecosystem that supports the advancement of broadband access and adoption.

We close this methodology document with 4 appendices. Appendix 1 refers to efforts related to Community Anchor Institutions. Appendix 2 describes data collection challenges. This section describes some of the open issues, challenges and questions we are exploring. Our hope is to receive clarification and counsel from NTIA in how best to confront some of these issues, which are likely common across states. Appendix 3 describes the confidentiality framework explained by NTIA. Appendix 4 details the provider universe, those providers found to be non-NOFA compliant and those providing data.

Purpose of This Manual

This technical document was developed to provide transparency in our data production process.

Our goal is to illustrate a thoughtful process designed to meet the intent of the submission. Our hope is that we have developed a process that is reasonable, with respect to the data it deals with, as well as flexible enough to change with evolving NTIA requirements and lessons learned from the Broadband mapping community.

Data Sources

Developing the Provider List

Broadband provider lists for all states were developed from the following sources:

- Prior comparable mapping/research efforts
- State lists of regulated telecommunications, cable and wireless service providers
- State and national industry organizations (i.e. cable associations, wireless service provider organizations, telecommunications associations)
- FCC Form 477 respondents
- Third party data sources such as Warren Media, Media Prints, American Roamer Coverage Right, GeoResults Wirecenter Boundaries and TowerCoverage.com.
- Independent web searches
- Interviews with key state staff members and important community influencers

As one would expect in a dynamic marketplace, provider identification is an ongoing and important component of our work. Mergers and acquisitions, the use of multiple regional DBAs, the lack of any universal identity management attribute, and the generally complex parent-subsidiary structure of many telecommunications companies, make provider identification and tracking very challenging. Because of this dynamic environment, the Provider list is reviewed on an on-going basis and changes are made as necessary to ensure that the list remains current.

At the start of each round, email and telephone contact is made to all known providers. This time consuming, but necessary, process ensures that the list of contact persons remains current, and that providers are aware of data request changes and deadlines associated with each round. This also provides an initial read out if corporate policy has changed impacting willingness to submit updated information. Where necessary, we execute new NDAs with providers. We maintain this communication with providers throughout the Data Collection period, providing multiple paths and opportunities for participation in the program. Providers that respond too late to be included in the final dataset are flagged for inclusion in the next submission. Unresolved data concerns are also flagged and tracked so that we can begin working on a plan for resolution prior to the next data collection round.

As contact is made in each round, we qualify each provider by asking a series of questions regarding the type of service and speeds offered. If the provider does not meet the minimum specifications for a

Broadband provider (as defined in the NOFA) we make a note of the change in status.[1] Providers remain on our list and are included in program communications so that in the event that their service is upgraded or expanded their status can be updated accordingly.

Provider Outreach

To meet the program's aggressive deadlines and participation goals, LinkAMERICA believes it is critical to maintain rapport with providers. To do this we reach out to providers with regular project communications, including a program newsletter and links to the various State mapping websites. In several states we have participated in trade association and policy summits.

As described above, individual e-mails and/or telephone calls are made to all providers explaining the status of the program and requesting their continued support. In some instances we've also had the opportunity to support providers in their BTOP / BIP applications. Through these collective outreach initiatives, and our engagement with various industry associations, we continue to enjoy a healthy and appropriate relationship with Broadband service providers.

NDA

To provide protection for all parties involved, LinkAMERICA continues to honor the terms of our NDA. If providers did not execute the NDA in previous rounds they were offered the opportunity to do so in this collection round. New providers were of course also supplied with a copy of the NDA.

To facilitate the execution of NDA's, LinkAMERICA continues to use the DocuSign online document management solution. This system allows providers to review and digitally sign the NDA in a legally binding manner, and has been instrumental in achieving rapid approval and execution of NDAs with the majority of providers. In some cases, NDA's were individually negotiated to address specific provider concerns. In all cases, minimum standards established by the NOFA are honored. In other cases, providers chose to submit data without executing an NDA.

Provider Survey

Since six prior rounds of data collection have been completed, the LinkAMERICA team has a solid base of coverage and speed information with which to begin Round 7. This allowed us to provide flexible response options to participating providers. One option allowed them to review check maps of their coverage and speed data – submitting only corrections and additions to the existing dataset. (For provider convenience the check maps were created in both PDF and Google Earth (.KMZ) formats.) The second option was to allow submittal of completely new datasets, either in tabular form or in multiple other digital formats. For those without CAD or GIS systems, we continued to allow the submittal of printed/scanned maps and other written materials.

[1] As with other Grantees, we struggle with appropriate and consistent classification for service providers who opportunistically provision Broadband services. In this submission we continue to bring them into the analysis as a provider type "other". As the inclusion of this category isn't our primary goal, we are working to process data as we can. We are similarly categorizing and retaining reseller information. Appendix 4 illustrates the categorization of non Broadband providers within our provider tracking and verification systems.

Survey Methods

Once again, we used a secure digital survey process (via our provider portal websites) to collect and display information for providers. The Round 7 survey process was designed to accommodate both new and returning providers, and the different types of information they would be submitting. The following is a summary of the process encountered by each group:

New providers: New providers were routed directly to our standard survey where they were provided with templates for uploading data in tabular NTIA-compliant formats. As in previous rounds, if providers could not supply information in the requested format, alternatives were offered. These alternatives included uploading service-area boundary maps, exchange area maps, CAD drawings or customer address lists. From that information, the LinkAMERICA team developed a geographic representation of coverage and was able to build coverage features for each provider.

Returning providers: For Round 7 we continued to work with participating providers to improve their datasets. Check maps continue to be a useful tool to show providers how their area would be displayed on the resulting interactive state map and to get constructive feedback regarding corrections and changes that need to be made to their coverage and speed data. Generating these customized documents in each round is an extremely time consuming verification process, but it allows us to close many of the gaps that might have otherwise persisted.

Follow Up

After the release of the Round 7 survey in early January 2013,, LinkAMERICA launched an extensive effort to encourage responses. Every known provider was contacted at least twice during the months of January and February. The initial data submission deadline was set for mid-February, but we continued to accept "straggler" submissions into September.

No Response Policy

As mentioned above, every effort was made to contact each provider who appeared on our initial list. However, if no current information could be found on the company (i.e. no website, no valid phone number, and no contact person identified) they were removed from the list of "known providers". We believe the majority of those we were unable to reach were providers who have simply ceased to exist[2]. If we verify that a company is a broadband provider still doing business and are not able to get a response to our request for data, we make note of that in our datapackage.xls, and continue to reach out to encourage participation.

Summary

In summary, an intensive 45-60 day provider outreach and data collection process is initiated at the beginning of each round. In Round 7, given the data vintage of December 31, 2012, we began this process in December and the last submissions were accepted in March 2013.

While we continue to successfully engage the majority of providers in each round, the amount of manpower required to solicit complete and timely responses should not be underestimated. This process is one of the most costly and complex within the entire SBI program.

[2]The list of known providers and important submission statistics are contained in the datapackage.xls file.

Third Party Data Used

We have acquired the following commercial/restricted use data products:

- American Roamer, Coverage Right Advanced Services (tabular). This data served two purposes. The first was to verify the provider list and help find Broadband service providers not on other lists. The second was to verify the reasonableness of the Broadband service provider's submission.
- GeoResults Wirecenter Boundaries. This data was used in the verification of 'telephone' Broadband provider data. Where a public domain exchange boundary wasn't available, the boundary was used for coverage containment tests.
- Media Prints Cable boundaries. This data was used in the verification of Cable/HFC Broadband provider data. It was used to research valid providers and discover if that provider was offering Internet service.
- FCC 477 restricted use data were analyzed to find valid providers within a given area.
- Proprietary Provider Serving Areas. Since the first survey, a number of providers have supplied their engineering, serving area and/or franchise boundaries. We have maintained and enhanced these proprietary data sources.
- Towercoverag.com. This site offers a web mapping service to fixed wireless providers, many of which meet the criteria for our program. Providers can indicate through this site that they want to share their information for use on the NBM. In addition to using the site for provider validation purposes we pull mapping data for providers doing business in our state. In most instances we have found it necessary to contact the provider directly to get a complete and accurate submission of information for SBI.

We have included third party data sources which touch on each of the three major technologies analyzed within the SBI program. Each of these data sources tie back to a public domain data source, which provides a cross-verification mechanism for the commercial data product.

Although there are a large number of third party licensed data sources available, we remain conservative in our acquisition plans. From our limited analysis we are concerned about the ability to cross-verify additional third party licensed sources against public domain data. Further, we are unsure of how we may be able to integrate another data provider's view of valid Broadband providers within the definitions used by the NOFA (e.g. Are they using an FRN/DBA identity view or a marketing view? Can the provider supply in a 7-10 day window? Are they facilities based or not?). This leads us back to a statement we made in a 'lessons learned' Webinar (April 2010) about exploring a consortia to lower the cost of data acquisition and allow multiple entities to peer review the quality and methodologies behind licensed data products.[3]

Beyond these commercial data sources, we used a number of public domain sources. These included:

Geographic Data Files

[3] We also suggested forming a technical standards committee and a consistent system for confidence reporting.

- US Census TIGER data[4]

Sources that helped isolate providers, identity management or provider service areas

- NECA Tariff 4
- State produced exchange boundaries
- Carrier produced wirecenter boundaries (sometimes proprietary to provider)
- FCC Coals reports (321/325)
- FCC FRN API lookup tool
- FCC/FAA Antenna Registration System
- FCC FRN Lookup Tool (plain text search)
- USAC High Cost FCC Filing Appendices

Sources that helped isolate anchor institutions

- USAC Grant lookup tool
- USAC High-Cost FCC Filing Appendices
- HRSA data warehouse
- NCES data lookup
- State managed lists of schools (K-12), post-secondary institutions and libraries
- List of museums, conventions, and visitors bureaus from www.onlineatlas.us
- In state relationships to key stake holders.

Finally, challenges exist when dealing with the inevitable conflicts between provider-submitted data and third party sources (public or commercial). There is no guarantee third party sources are more accurate or timely than the providers' own reports. Indeed, some third party sources are based upon different standards than those specified in the NOFA, perhaps making them less reliable than information collected directly from providers. At the very minimum, provider data has a lineage and temporal status that we can identify. A concern we have with increasing use of third party data is that we have no way to verify its quality or development methodology. Particularly in rural areas we are concerned about what third party data may reflect based upon what we assume to be a small sample of information.

In other words, we may hit a wall in which we can't determine how the commercial source derived its coverage conclusion. To us this means that third party data sources are beneficial, but represent a supplementary view, not an authoritative one, of the NOFA defined Broadband market.

In short, we have chosen to use provider data as the baseline. We will challenge provider reports when third party data shows major anomalies, when submitted data conflict with prior submissions or when a consistent volume of consumer feedback points to a potential error.

[4] Census data were derived from < http://www.census.gov/cgi-bin/geo/shapefiles2010/main>, Census 2010 files. Roads were derived from the county faces and edges file downloaded at the same location and tiled for a full state.

Confidentiality and the Use of Licensed Materials

As a mapping vendor, we are reliant upon the cooperation of Broadband service providers. In large part, what underlies this cooperation is trust that we will not violate the proprietary and confidential nature of the data provided to us.

We are thankful for the confidentiality clarification that NTIA shared with us (included as Appendix 3). We use this as a guiding document to help us communicate with providers about what information NTIA considers to be confidential. Our suggestion is that NTIA publish this, or something comparable, to ensure a consistent interpretation of the NOFA and how it guides NDAs.

As some providers are non-responsive to requests for information, or lack resources necessary to put data into NTIA compliant formats, we have fallen back to the use of commercial data sources in several places.

For incumbent telephone providers we have used commercial wirecenter boundary products to filter Census Blocks and segments that are clearly out of their exchange areas. For cable providers we will use an estimate based upon Census Designated Places within MediaPrints named areas.

Public Engagement: Crowd Sourcing, Surveys and Social Media

Crowd sourcing (i.e., an intentional and carefully designed effort to tap into the collective intelligence of the public at large to expand our knowledge base) continues to be an important element of our data collection and validation process. An expanding use of social media is also an important strategy in our efforts to promote the programs overall and engage more citizens in the work at hand. To that end we offer various opportunities for the public to provide input via the online service coverage maps and the related 'Broadband story' process. These opportunities along with assorted public surveys have provided important information for the broadband effort in our state. As previously stated we see worth in engaging the public in this program and have found value in using social media outlets such as Facebook and Twitter to advance our process.

Consumer Surveys

Consumer surveys funded by the SBI grant have been hosted in our states over the course of this program. Many of which will be repeated over the remainder of the program by instate partners to establish and evaluate trends. The resulting data is helpful on a number of fronts in the SBI's mission to advance the access and adoption to Broadband. Survey data provides an important, albeit broad, gauge for assessing coverage information obtained by providers. For example, areas with widely available coverage (according to provider information), but lower consumer subscription levels (according to survey results), or perhaps where survey results suggest Broadband is not available, can be examined in more detail. Survey results are also very important to the broadband planning (and capacity building) components of the SBI program in that they help inform and formulate Broadband advancement priorities. Survey results also help inform Broadband policy discussions on both the local and state levels. Finally, survey results provide important information to the service provider community regarding market demand and Internet use in specific communities (i.e., regions).

Social Media

The phenomenon of social media is widely documented and is emerging as an effective access point for public engagement. We continue to explore appropriate ways to use a variety of social media venues in our SBI efforts. All of our efforts are informed by and consistent with relevant state statues and guidelines. Each state has a different perspectives on if and how the state will participate in the use of social media. Some state requirements are well defined and some are still being formed. Where appropriate, we use LinkedIn, Facebook and Twitter to support our work. A central focus is on promoting awareness of the program and seeking to expand engagement. In some situations we find that sub-program initiatives (e.g., regional planning teams) are making very effective use of Facebook to help inform and engage citizens impacted by the SBI program. In addition, we continue to evaluate how Facebook and Twitter can be used to drive public input on two important crowd sourced issues: online speed tests and input on map accuracy. Based on data obtained through our web site traffic monitoring process and readily available social media tracking processes, results are promising.

Capacity Building and Transitioning to State Partners

A fundamental goal of LinkAMERICA has always been to transfer knowledge and capacity to our in-State partners.

Within each State, transition planning and responsibility for specific activities is on a slightly different timeline. Much of this is driven by resource availability and partner identification within the State. For example we began transitioning the responsibility for Community Anchor Institution data to the State of Alabama in Round 3, starting with the use of interns to validate Community Anchor Institution data. In Round 4 the state's responsibility expanded to include collection of all CAI data, and in Round 5 the effort culminated with Alabama assuming responsibility for the CAI submission. LinkAMERICA supported this process with detailed transition documents and technical support. Alabama is continuing e the transition process assuming responsibility for the state website in the first Quarter of year 4 and is on track to assume hosting responsibility of the state map by Quarter 2.

In Idaho the SBI Framework Coordinator took on the responsibility of reaching out to CAIs in round 5. Since that time he has been working on a new outreach tool to enhance the data collection effort. Idaho, Wisconsin, and Wyoming are all working toward the goal of taking on responsibility for hosting the state map and website by the end of year 4. LinkAMERICA is providing support for this progression in each state with program leadership, technical assistance, tools, and project plans to ensure a smooth transition process.

Data Sharing With Other States

Where possible, LinkAMERICA works to share data with other state mapping entities. This data exchange tends to take two routes.

First for wireless providers if we find a fair amount of coverage that crossess into an adjacent state, we will ask the provider's permission to convey this information to the neighboring states. If the permission is received, we send the data to the mapping agency.

Second, in circumstances where we receive a speed that is outside of the technology speed 'norms' and this provider offers service in another state we try to check with other covered states to find out if the service is comparably marketed.

Trends in Submitted Data

Overall we note several important trends in this data submission. The list below represents general trends and not a scientific survey.

We note the following trends:

Activity from the FCC regarding the Connect America Fund has influenced the activity of providers and policy makers. In late December 2012 questions regarding coverage, partial coverage and updating to the round 6 maps took on much importance. This particular Public Notice generated a number of complex and ambiguous questions. We tried to assist users as best we could within the constraints of available time.

The coverage of advertised speeds is increasingly important. More and more providers are specifically concerned about where the submitted NTIA footprint shows available of 4 x 1 Mbps or 6 x 1 Mbps service.

Large national providers are beginning to submit block level speed information. In round 7 Windstream submitted block level coverage and speed. Other national Wireline providers, are more carefully reviewing the submitted coverage to ensure that it is consistent with their expectations.

xDSL speeds are increasing. More and more xDSL is likely ADSL 2+, VDSL, shortened loops, pair bonded or some combination of these. As we talk to providers who trigger speed/technology tripwires, we receive more and more feedback about the presence of these new technologies to enable speeds comparable with DOCSIS systems.

DOCSIS 3 is becoming the norm. Most cable systems are becoming DOCSIS 3.0. Over time we are seeing the DOCSIS 2.0 areas diminish. In some DOCSIS 3 areas there tend to be pockets of non DOCSIS 3 in predominant DOCSIS 3.0 markets.

There seems to be an increase in acquisitions among fixed wireless providers. Sorting out the acquisitions and territory abandonments has been complex and time consuming.

Fixed wireless providers are offering broadband services approaching 1 Gbps. This is occurring both in terms of licensed and unlicensed spectrum. Part of this is driven by where a provider has fiber or high capacity wireless backhaul but we are receiving more and more information from providers and radio manufacturers specific to very high speed wireless services. Although the service can be deployed

within the 7-10 day NOFA window, these higher speed services tend to be purchased by high capacity customers. It may be worth reconsidering the speed norms in this category as well as adding a field in the data table to indicate when a speed value is geared toward a specific end-user class.

There is less and less of a distinction between fixed wireless and mobile wireless. As firms market LTE and/or WiMax as home DSL alternatives we are a bit unsure how these two classes are to be established-what is the operating distinction between Transtech 80 (mobile licensed) and Transtech 71 (fixed licensed) when both are used as in-home Broadband service?

Satellite providers are advertising broadband services comparable in speed to xDSL. Some satellite spectrum codes are not available for use in the data model. Some satellite providers are beginning to indicate a difference in speed within the states. We are working with providers to clarify this new type of submission.

We continue to see a number of national Broadband providers who do not show broadband coverage within pockets of otherwise covered areas. In the figure below, the orange represents Census blocks which are NOFA broadband covered. The transparent areas have no NOFA broadband coverage from the same provider.

Figure 1--Uncovered pockets within urban, covered areas

This coverage drop-out appears to be happening in urban Census blocks typically with schools, shopping malls, universities and large businesses. We don't know why this is happening, but it could be an impact of the NOFA restriction on 7-10 provisioning. This is a noticeable artifact in the data and does challenge the notion of some who see NOFA compliant Broadband coverage as a uniform surface across an area.

We see a pattern of some providers clipping their coverage to reflect what we believe are license boundaries. Although the coverage clips have been apparent in the past, they appear more abrupt in this round.

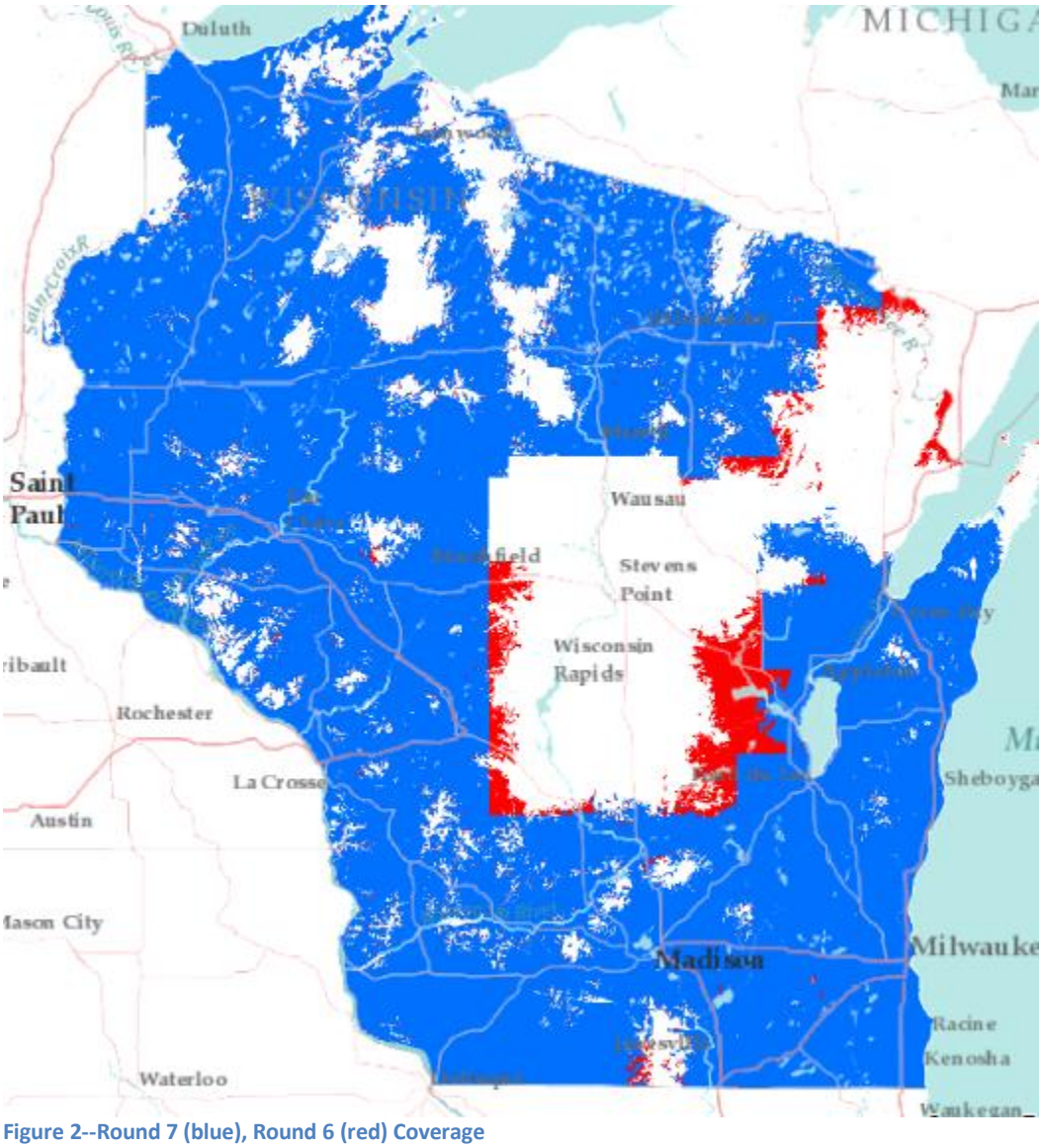


Figure 2--Round 7 (blue), Round 6 (red) Coverage

Data Production Process

To support our objective of transitioning the data development process to our State partners, we continue to model, refine and document our data production process. We find this to be a very beneficial step for two purposes.

First, it helps us understand why (and if) a task is being done, and if it is being done efficiently. Much of this program started so quickly that it was difficult to plan logical integration and hand off points among the various workgroups. Further, we are currently in the process of consolidating much of the process data (check-ins, check-outs, metadata) and we can use this process model to efficiently plan cohesive information architecture.

Second, our process documentation and modeling helps explain why resources are being consumed in a particular way. This helps our State partners plan for in-sourcing specific tasks as their time and budgetary constraints allow. It also helps our LinkAMERICA team better plan and cross-train members to deal with the work surge that occurs 30-45 days prior to submission.

Finally, documenting and modeling our process helps us to take advantage of increasing specialization and proficiency with certain types of data and management responsibilities. In submission 3, we had identified data "czars" responsible for check-in and check-out of data. That data czar helped to bridge the gap among receipt functions, provider feedback, production and DBA. In round 5 the data czar was also tasked with alerting on speed/technology tripwires. This individual was responsible for taking the initial review of each submission and determining if an NTIA speed/technology warning would be triggered.

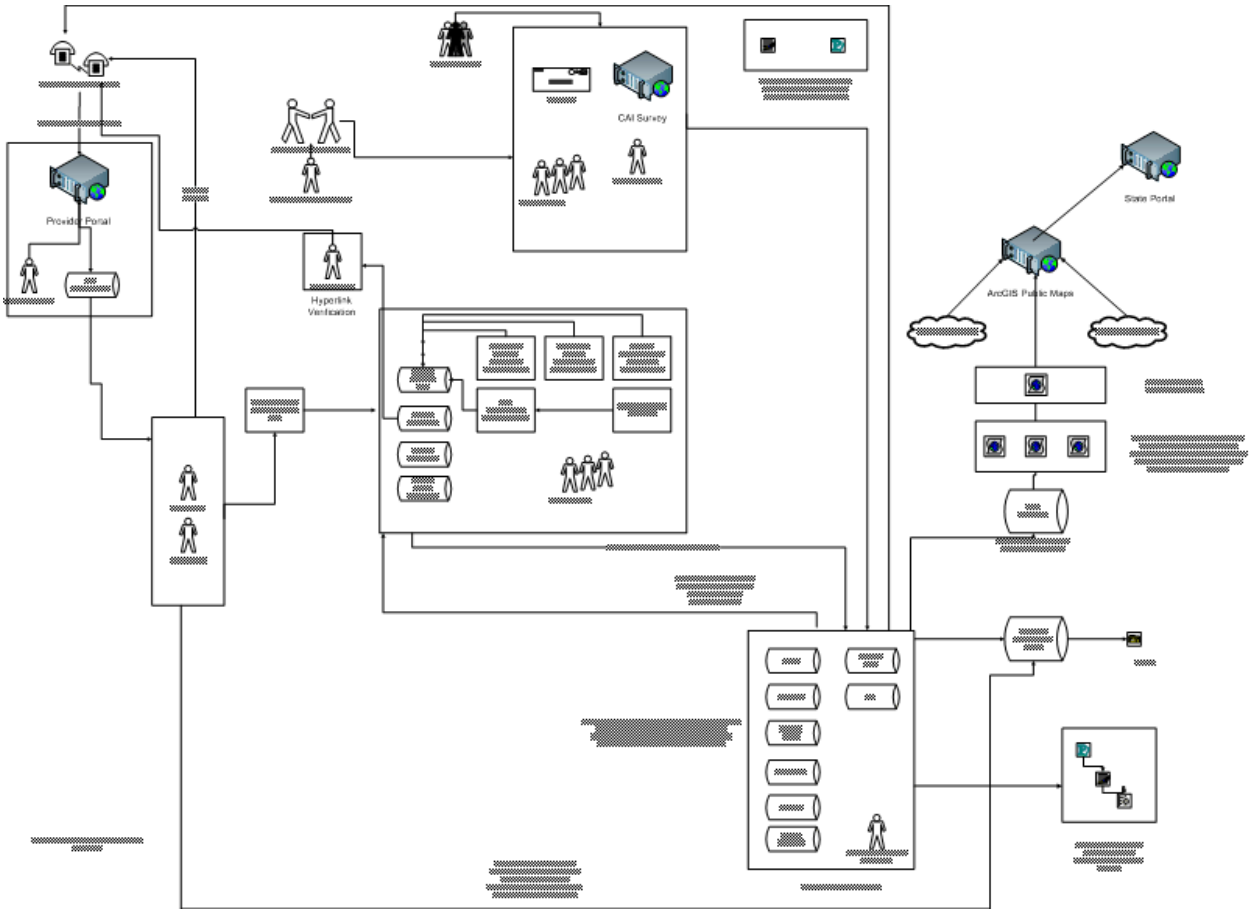


Figure 3—SBI Data Development Business Process Diagram

Provider Tracking In the Cloud

Prior to initiating the Round 5 survey, LinkAMERICA transitioned in house provider tracking systems to a Cloud based application, TrackVia.

The movement away from desktop solutions was based upon several factors. First, the architecture these systems were designed under no longer met the program realities. For example, deliverables like Datapackage.xls were not contemplated when the original provider tracking system was developed. Second, the ability to share data across multiple geographic areas and organizations was becoming increasingly important as the program evolves and responsibility moves to in-State partners. Third, portions of this data need to securely transition back to State resources who may or may not be able to support a specific IT infrastructure. These factors combined to make the Cloud applications a valuable alternative.

As with any IT transition, the process has not been without challenges. Nonetheless the investment in time and resources has proven to be effective and worthwhile. We anticipate further movement away from desktop oriented architecture to a more open, Cloud type solution.

Data Production Methods

As raw data were received from the provider community, attention turned to normalizing the disparate submission formats[5]. The team considered each submission with respect to the following criteria. These criteria are important because they perform the basis for our verification and quality assurance process. In other words, we have to appropriately scale our data verification efforts to match the scale or ambiguity of the following:

- Locational certainty
- Speed certainty
- Temporal certainty
- Provider and network ownership certainty

The team's goal was NOT to quantify a particular degree of precision with respect to any of these criteria. Rather, we are working to attribute the above "certainty attributes" to each submission, and will continue to implement quality assurance and verification mechanisms that are resource-appropriate for each.

Deriving Broadband Coverage Information

Broadband Coverage[6] was normalized into four formats:

1. Coverage in Census Blocks (2010) of 2.00 or less square miles
2. Covered Street Segments (2010) in Census Blocks greater than 2 square miles[7]
3. Address Level Coverage (point data)
4. Wireless Service Areas (SHP file format)

With each submission, the team went through a series of steps to normalize and categorize the data. Since data arrived in many different formats, and at many levels of granularity, the following normalization procedures were used:

- Determining the nature of service being provisioned (who is providing service and what technologies are in use)
- Planning an attack strategy for the submission –understanding the data and assigning team members to various tasks
- Alert provider relations staff if the received data trigger an NTIA speed/coverage tripwire.
- Georeferencing the data; QA the georeferenced data
- Geoprocessing the geo-referenced response

[5] In line with NTIA Best Practices we continue to request and receive a large number of data input formats. This ranges from tabular block lists to hand drawn maps.

[6] Speed, Anchor institutions and Middle Mile facilities are discussed in later sections.

[7] To help clarify issues relating to Census block area and vintages in use, our team published a technical paper to the Grantee workspace. Because we were unsure if this standard should be implemented uniformly, this document was never distributed to the provider community.

- Segregating the submission into the correct NOFA-compliant submission formats.
- Apply appropriate source metadata[8]

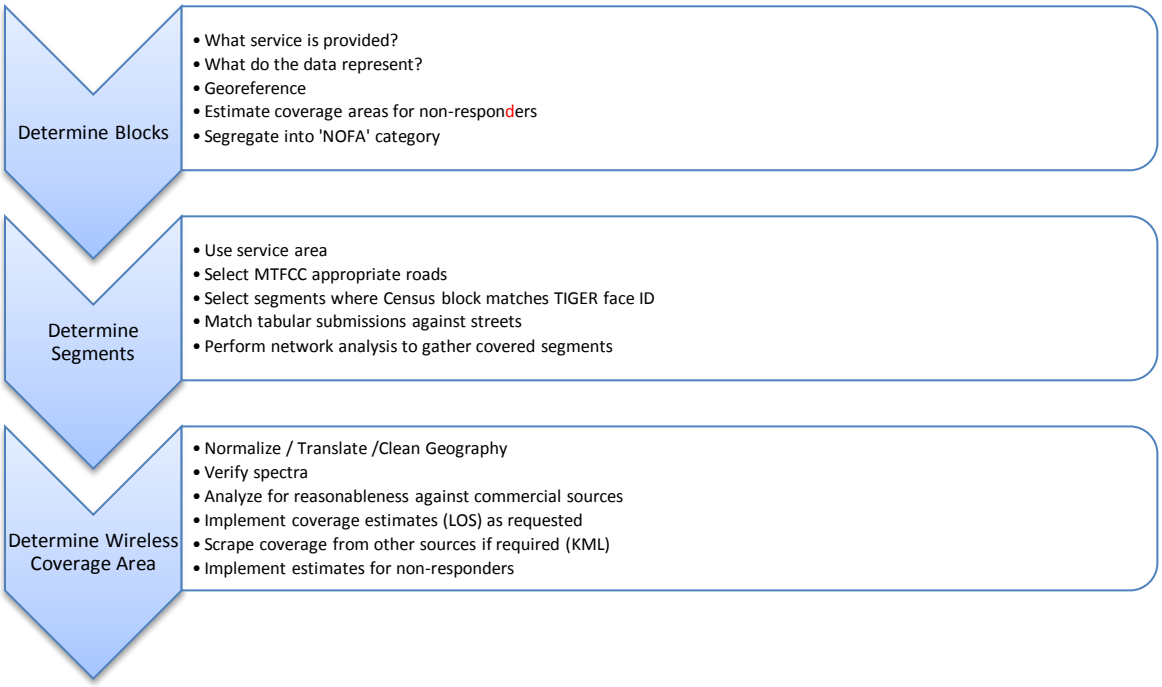


Figure 4-Components of Broadband Coverage Process

Impact of Program Change

There were several important program changes that impacted how Broadband coverage was developed and submitted to NTIA in Round 7.

Speed Examination

Given recent concerns about the depiction of speed and what that mapped speed represents, LinkAMERICA invests considerable time requesting detailed information on speed which appeared to be beyond normal speeds for a given Technology of Transmission given the NTIA supplied frequency tables.

Based upon these conversations we learned

A) For incumbent telephone providers; the speeds beyond the normal xDSL range represent significantly shortened copper loops, as well as upgrading DSLAMs and modems to support ADSL2+ or VDSL.

B) For cable providers the intermixing of DOCSIS 3.0 and non 3.0 systems in a market area is typical and sometimes reflects a circumstance where segments of plant cannot be upgraded to DOCSIS 3.0. This variance can be at a level below the Census block. In these cases the maximum advertised speeds

[8] When our team logs a submission into the staging database we record at least two attributes. One records the method used to derive the coverage, the other records the method by which speed was attributed to that object. Other attributes carried to NTIA carry source meta values as well.

remain to represent the market area but the plant variance is typical. We also have one 'cable' provider who is delivering DOCSIS 2.0 over fiber plant (RF over Glass or RFog).

C)There exists a fundamental disconnect between some providers reporting a service qualified speed--the maximum speed available at a structure versus other providers submitting their maximum speed at the market (MSA/RSA level). Both submission paths are available to providers but the likelihood of providing a speed incompatible with a technology is much greater for providers submitting market level speed. For the most part, wireline providers are submitting block level speeds. This creates a fundamental disparity between the wireless speed reporting between wireless and wireline providers.

D)Fixed wireless provides are using new radio technology to quickly deploy services which rival and sometimes exceed those of wireline service providers. These speeds are being advertised, sometimes on public facing websites as well as using direct field sales staff to target specific high demand customers. These services are actively marketed but they challenge the data model in that the speed is marketed and available within 7-10 days of request but the nature of the fixed wireless submission forces attribution of this speed within a potentially large geographic area.

E) There exists a minority of providers who submit a theoretical speed that is unmatched by their web advertising. In these cases we request clarification from the provider on the inconsistency. Our experience has been that providers will modify the speed to be consistent with their marketing and advertising.

F) The maximum advertised speed offered is not always clear. Sometimes the speed is described in advertisements in terms of a combination of video and data. Other times it is data not video. Some providers allow a customer to select how much bandwidth they want to allocate to their data stream versus video stream. In other words the bandwidth available to a household is constant but how it gets allocated among the data versus video becomes a customer or service directed choice. This makes getting Maximum Advertised Downstream speed very difficult because it is not just a product of the broadband network which we are mapping but also the customer's selected service package. Upstream is rarely advertised. Different marketing channels (Business to Consumer versus Business to Business may yield different marketed speed combinations.

Provider Definitions

Within our provider verification process we work to derive a state level provider match against third party data sources. As discussed in the early pages of this manual, there is no guarantee that a third party data source is any more accurate than submitted data, nor does it necessarily reflect the provider ecosystem specified in the NOFA, Technical Appendix A. We devote significant resources to matching our submitted data against outside data sources. In many cases this becomes a judgment call trying to match provider names across systems. It is a difficult and somewhat arbitrary process. Nonetheless we

do believe it has value because it forces a re-examination of who we believe is an appropriate provider within a non-NOFA context[9].

The use of a provider match system, as well as the webinar comments (3/17/11)[10] directing grantees to estimate, wherever possible, non-participating providers have made us back away from one of our fundamental assumptions in data collection. As discussed in prior versions of this manual, we had developed a certain "hold-out" class of data when a provider's data wasn't of sufficient quality to verify, or we were unable to put it into the data model (e.g. address points submitted for fixed wireless). In submission four, much of this hold-out data was included[11]. In some cases this involved using simple polygons to capture a wireless ISPs serving area. Other times, if we are confident in the coverage, but can get little clarification on the submitted speeds or frequencies, we release the coverage and note in our internal metadata the source issues with the other attributes.

In the weeks leading to submission 5 we received a request from NTIA to clarify the presence of unusual shaped wireless polygons. Our interpretation of this was a request for information relating to the source of these data which do not appear as propagated coverage. Although the 'unusual shapes request' represents a very small portion of the submitted data, it begs an important question about the expectations with respect to wireless coverage patterns. We look forward to working with NTIA to address these issues in a fair way across States and providers. We would not want to create a coverage dichotomy where advertised coverage was disallowed from the NTIA submission because of an expectation about how advertised coverage should appear. One concern we have when we develop a coverage estimate which differs from a providers advertised coverage pattern, which should we submit? As of the current round, this remains an open question.

Finally, we use the provider type classification of 'other' to bring specific aspects of certain provider's data into our submission. There still seems to be confusion on how to handle provider types where a provider offers multiple paths to provision Broadband for typically business customers. Rather than waiting for certainty on the answer, we bring the provider in and list them as provider Type "other". Our sense is provider Type "other" will continue to expand in subsequent submissions.

Clearly one challenge is the data, but an equally significant challenge is appropriate messaging around this "other" provider type category. We do not want to leave consumers with the impression that they can get a high capacity fiber or microwave link despite the fact that the hospital next to them or in a nearby Census block can get this service.

[9] We have requested from NTIA information on how provider matching is done within their QA process; beyond the relatively short whitepaper posted with the national map <http://www.broadbandmap.gov/blog/wp-content/uploads/2011/02/DataComparison_Methodology2.pdf>, we have not received any more detailed information on how providers are cross verified between submitted and third party sources at the national level. Our understanding is licensing concerns are holding the release of this information.

[10] Clarifying comments from Akins Lawl indicate the Program Office does not want Satellite providers estimated if the provider is non-responsive to data requests (email 9/12/12).

[11] We continue to process older submission data looking for information and methods by which we can estimate coverage information. This will be an ongoing process.

After the April 2011 Grantee conference, LinkAMERICA submitted a paper describing our provider classification system[12]. It is our feeling that understanding the type of provider is essential to appropriate verification methods.

Coverage Geoprocessing Methods

The next section discusses how data were georeferenced and geoprocessed given a particular submission format. We have yet to find a particular method that works across all submissions. Rather we tend to tailor our geoprocessing to meet the specifics of the service provider and data submitted.

In most cases, in Round 7 we were not provided with street segment geographic objects for Blocks greater than two square miles (large Blocks). This necessitated subsidiary geoprocessing. As stated before, our first goal was to derive block level coverage. Then, for Blocks greater than 2.00 square miles, we moved to a segment gathering processing. The segment process will be described in the last section.[13]

Block Level Coverage Derivation Using Service Point Data

A number of providers submitted point level customer data.

In some cases the submissions themselves were not internally consistent. For example, in the image below, unprojected points are shown, while the Census block polygon to which the points are supposed to "belong" is highlighted. In this case, one of the following scenarios has occurred: block attribution is wrong, the points are not in the location to which they are attributed, or different block shapes were used than what is assumed.

[12] https://sbdd-granteeworkspace.pbworks.com/w/file/42309493/provider%20ClassificationFINAL.docx

[13] As has been discussed previously, we note inconsistency in how providers are supplying information at the block and segment level. Beyond the temporal differences, we see that providers are computing area differently, as well as including or excluding water areas. This provides an inconsistent measure across providers for the 2.00 sq mile cut off. Our preference would be to provide guidance to service providers within our states, but our concern is that we will inconsistently message this with grantees in other states. We would appreciate consistent guidance from FCC/NTIA on this topic.

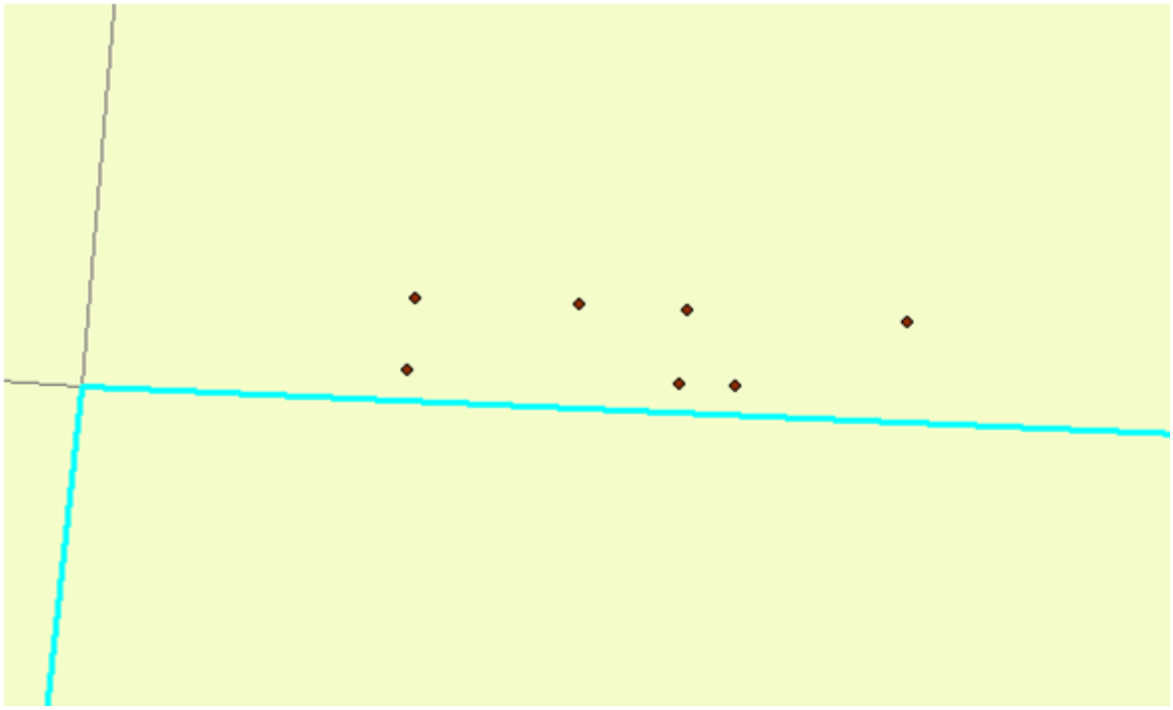


Figure 5-Internal inconsistency in submitted data

In other circumstances, we found that inconsistent geocoding standards may produce misleading results. The next image shows point level data, and the Blocks are colored based upon the counts of points intersecting Blocks. The challenge this presents is that if geocoding was performed on a different dataset than the block boundaries (the road traces are not coincident with block boundaries) and/or geocoding was done without an offset, it becomes problematic to assign coverage to a Census block based upon only the point locations.

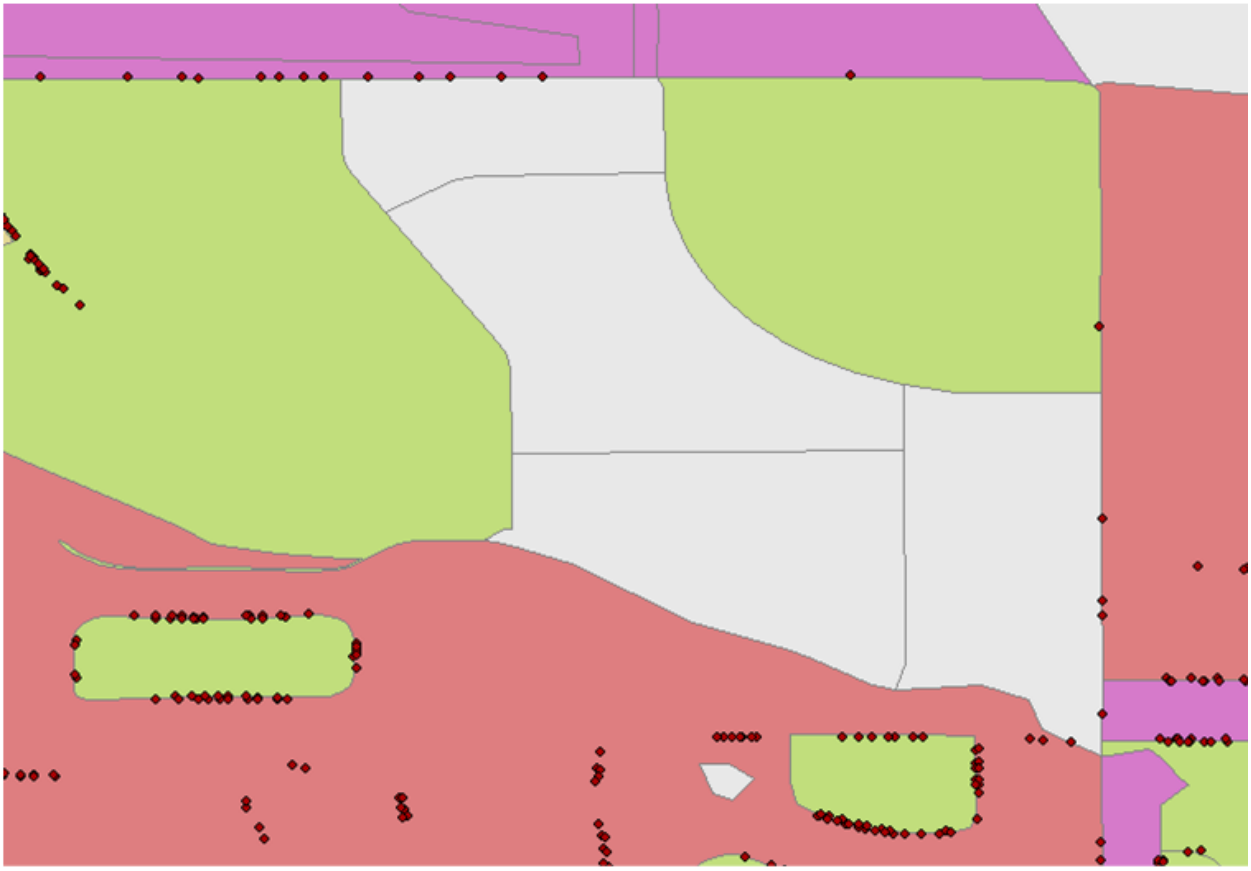


Figure 6-Block Coverage

For this reason, where we were provided address point data and asked to generate covered Census blocks, we elected to use a 200-foot buffer to select Census Blocks that intersect our points.

We also see a number of providers submit customer data and facility data. Their intent is to allow us to have two primary sources from which to derive the most accurate coverage. In these cases we tend to look for clusters of customers in areas where we see no facility based coverage.

With respect to deriving Block level speed from sub-Block data, we have instituted a business rule where the predominant speed in a Block is the speed we attribute to the Block.

Block Level Coverage Derivation Using Customer Facing Plant Level Point Data

In other circumstances, providers submitted point level plant data. From what we could gather, these points tended to be customer-dedicated terminals. Typically, these providers were high speed Broadband producers—which may somewhat strain the definition of Broadband as other providers supplying comparable services specifically disclaimed the ability to provide high-capacity Broadband services in the required 7-10 day interval. In these plant point data submissions, we had similar concerns to the point level customer data, but two factors tended to make us use a more conservative intersection buffer. First, we tended to have far fewer points to work from, so our concern was grabbing too many covered Blocks as the Blocks tended to be much smaller in these urban areas.

Second, these plant points tended to be dedicated to distinct customers, but it was difficult to know which element of the customer's campus to attach coverage to.

In the case of the image below, given a small shift to the left, it would be easily possible to gather 1 to 3 Census Blocks from this point. Although orthoimagery is helpful in a circumstance such as this, it is still indeterminate.

Thus, in the circumstance of plant level point data, we used a 100-foot intersection buffer.

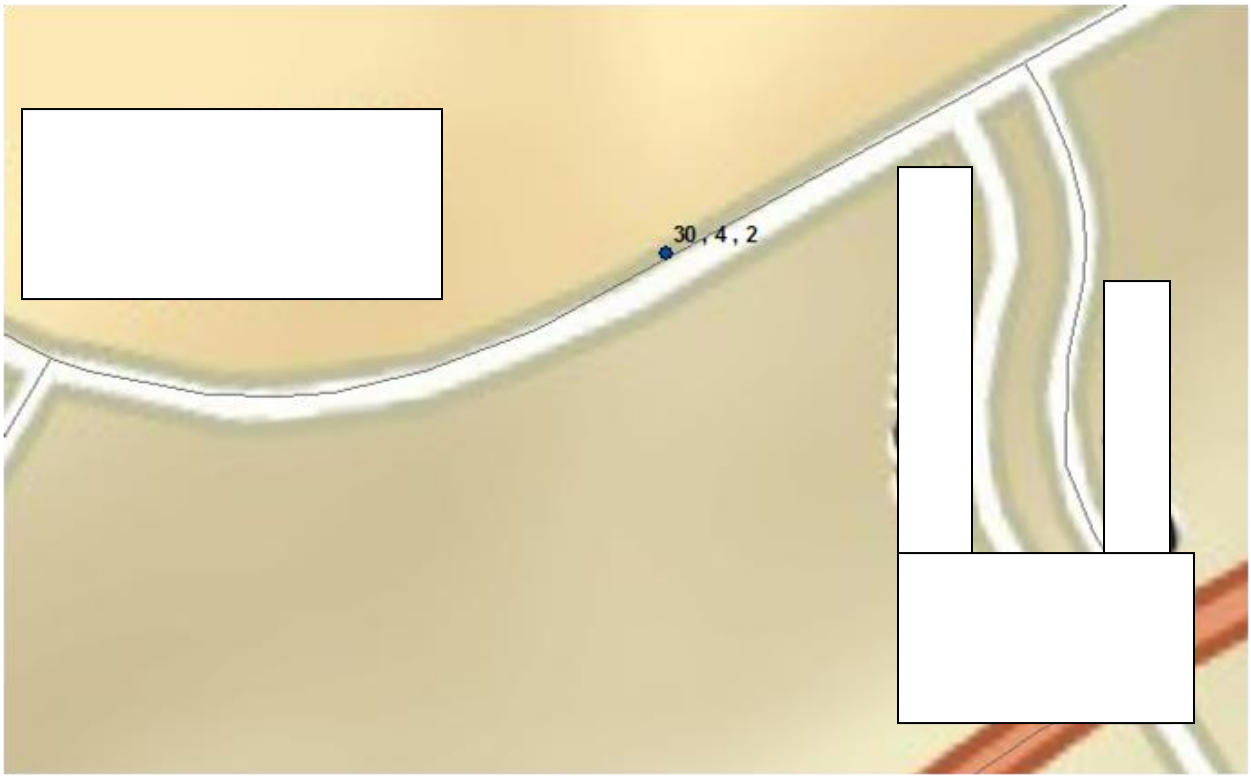


Figure 7-Plant Point level data

Coverage Derivation Using Linear Facilities Data

A number of providers submitted facilities data. We handled this data in different ways depending upon what we believed the facility data represented.

Most telecommunications networks are divided into two components. Feeder - supplies higher capacity nodes (eg. DSLAMs, Fiber Nodes). Distribution - usually supplies customer premises (NIDs, Pedestals, Taps, ONTs). Where we could discern what facilities we were provided, we used different methods.

The next image demonstrates a geo-referenced CAD image as given to us by a service provider. Note the light and dark green shading. We would infer that the lighter segments represent distribution and the dark green represents the feeder network.

In the case of a combined strand map, we used a relatively tight buffer of 200 feet to gather covered Census Blocks. Our intersection tolerance is based upon an assumption that our data likely represent a

situation comparable to customer point level submission in that we have most of the network footprint captured.

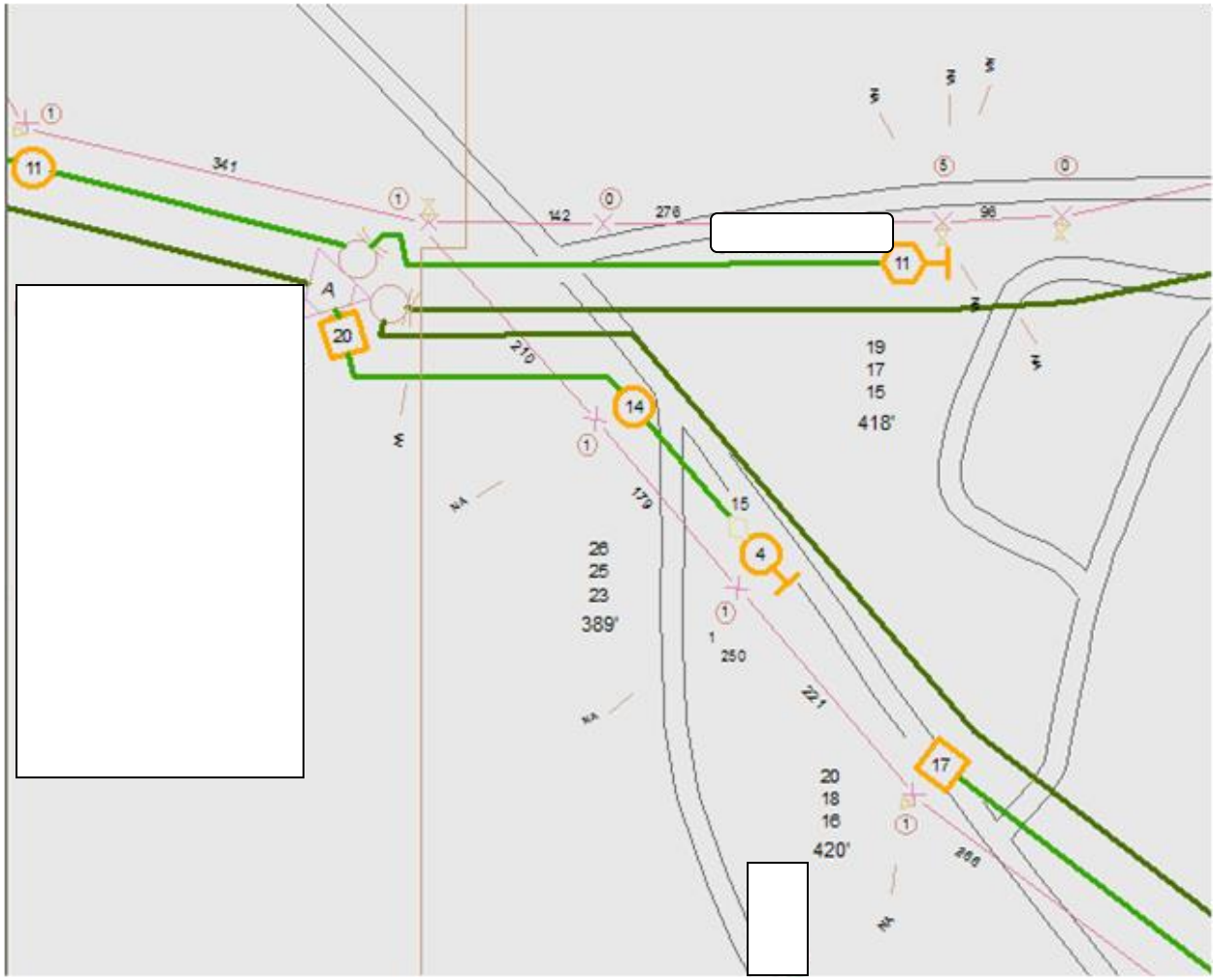


Figure 8-Georeferenced CAD information supplied by Broadband provider

In other circumstances, we were provided engineering information that we inferred to be feeder only. This inference was typically based upon the presence of fiber optic equipment only. In these cases, we used a more generous 2,000 meter Census block intersection. The 2,000 meter criteria was based upon an informal survey of population in proximity to the geo-referenced strand data, but it could be varied based upon a more complete survey.

Coverage Derivation Using Covered Street Segment Data

In some cases we were provided with covered street segment data. Covered segments tended to come from two sources.

In some circumstances, providers gave us CAD data, which was not drawn in a projected manner. This is relatively common for older engineering data derived from hand drawn records. This meant that our

team geo-registered the image into an approximate position. In this case, the boundary streets were selected, and an enclosing polygon was derived. The intersection of this polygon and the Blocks within became the geoprocessing method to derive Blocks.

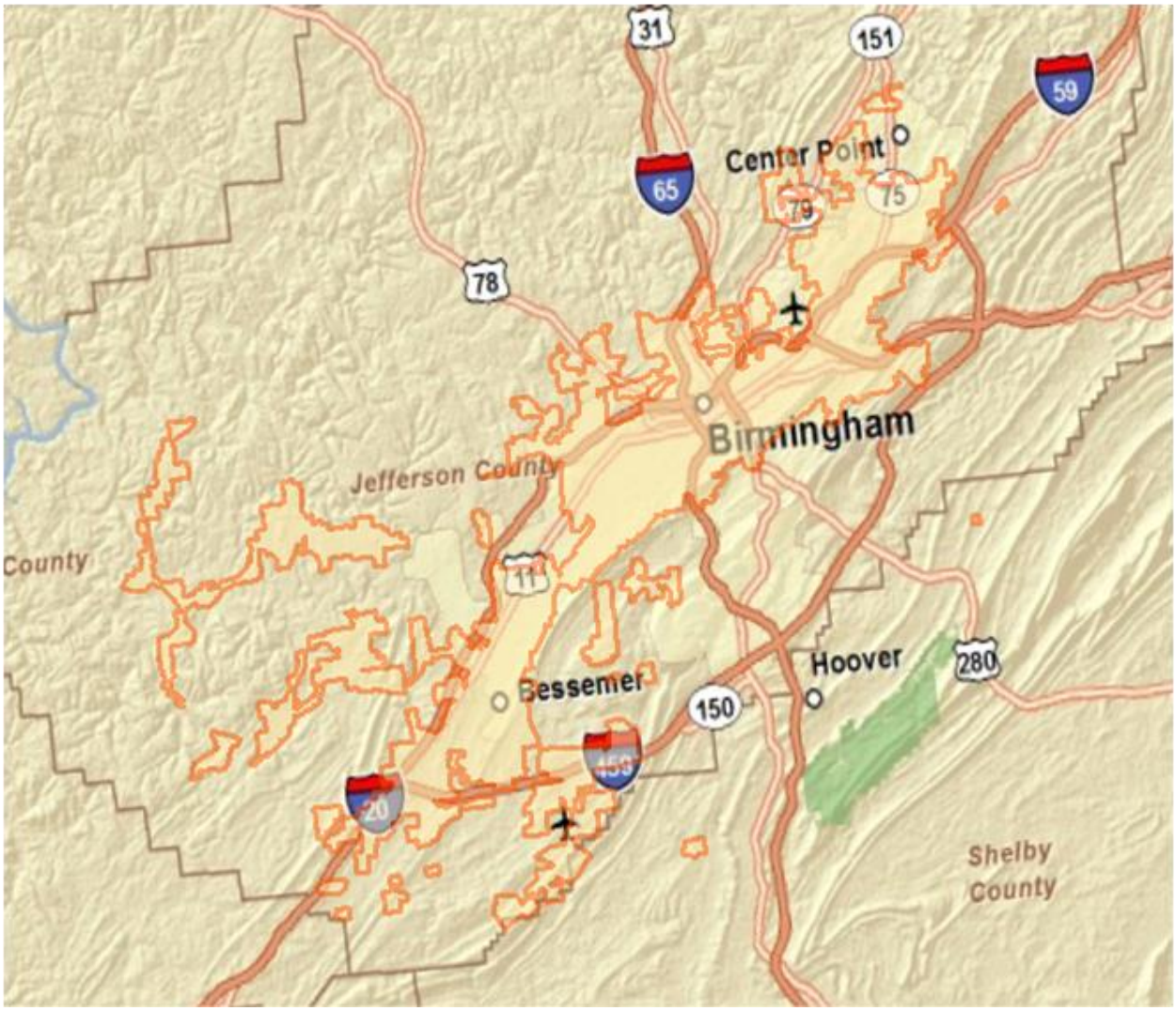


Figure 9-Coverage derived from street segments

In a second circumstance, street segment data was developed during coverage estimation. Handling the estimated data is discussed below.

Coverage Derivation Using Serving Area Point Submission Data

In other cases we worked with providers to derive service areas based upon point plant data. In these cases we were given a serving node and an appropriate road length service boundary. There is an important distinction from the plant data discussed above. In this specific case, the data submitted was a node that served many locations--such as a Central Office or DSLAM. This is contrasted with the earlier example in which the point represents a node serving only a few customers.

When trying to derive coverage from Central Office or DSLAM nodes, the team used ESRI Network Analyst to derive covered road segments honoring these road engineering parameters.

The figure below shows street level coverage derived from Central Office and remote DSLAM point data.

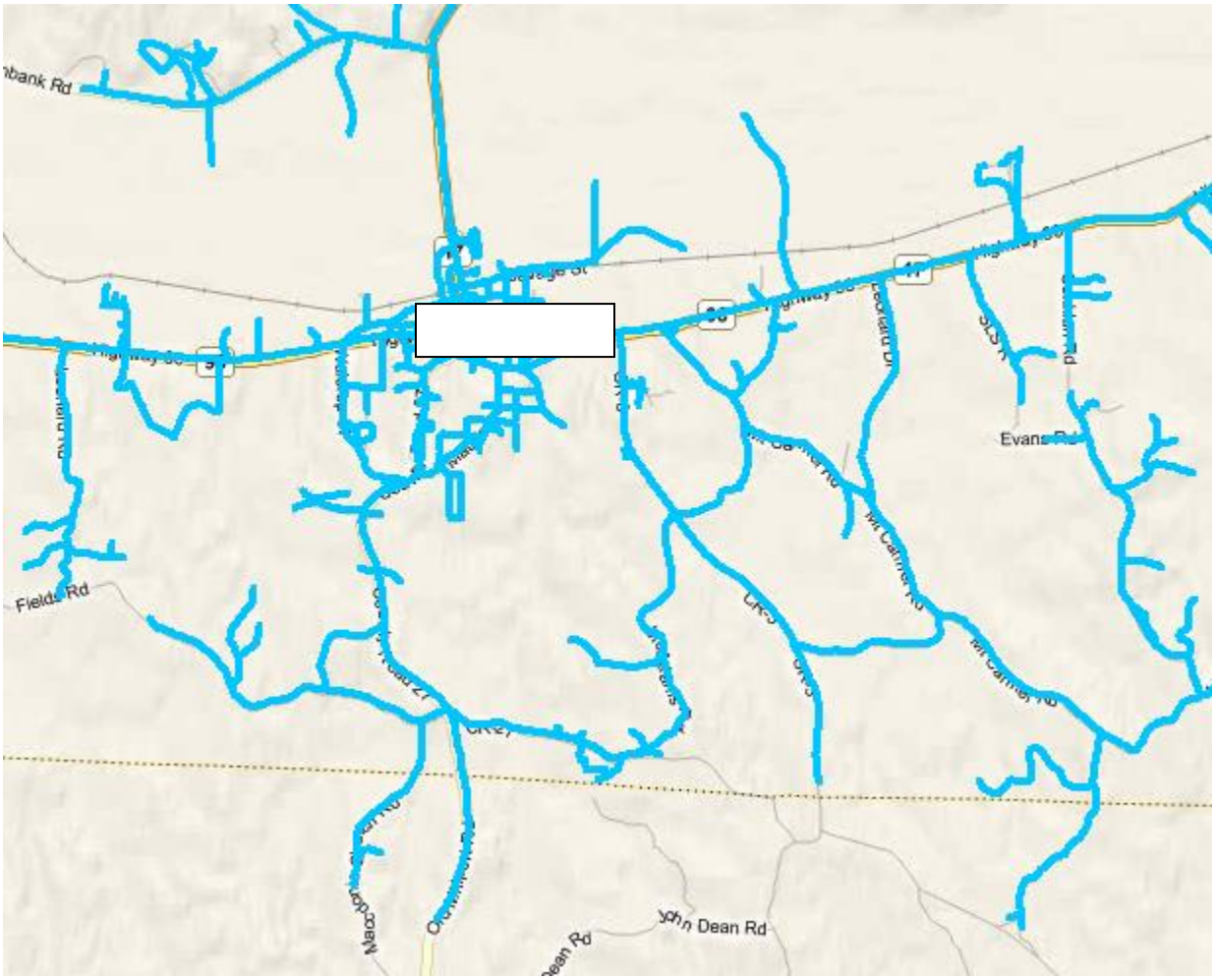


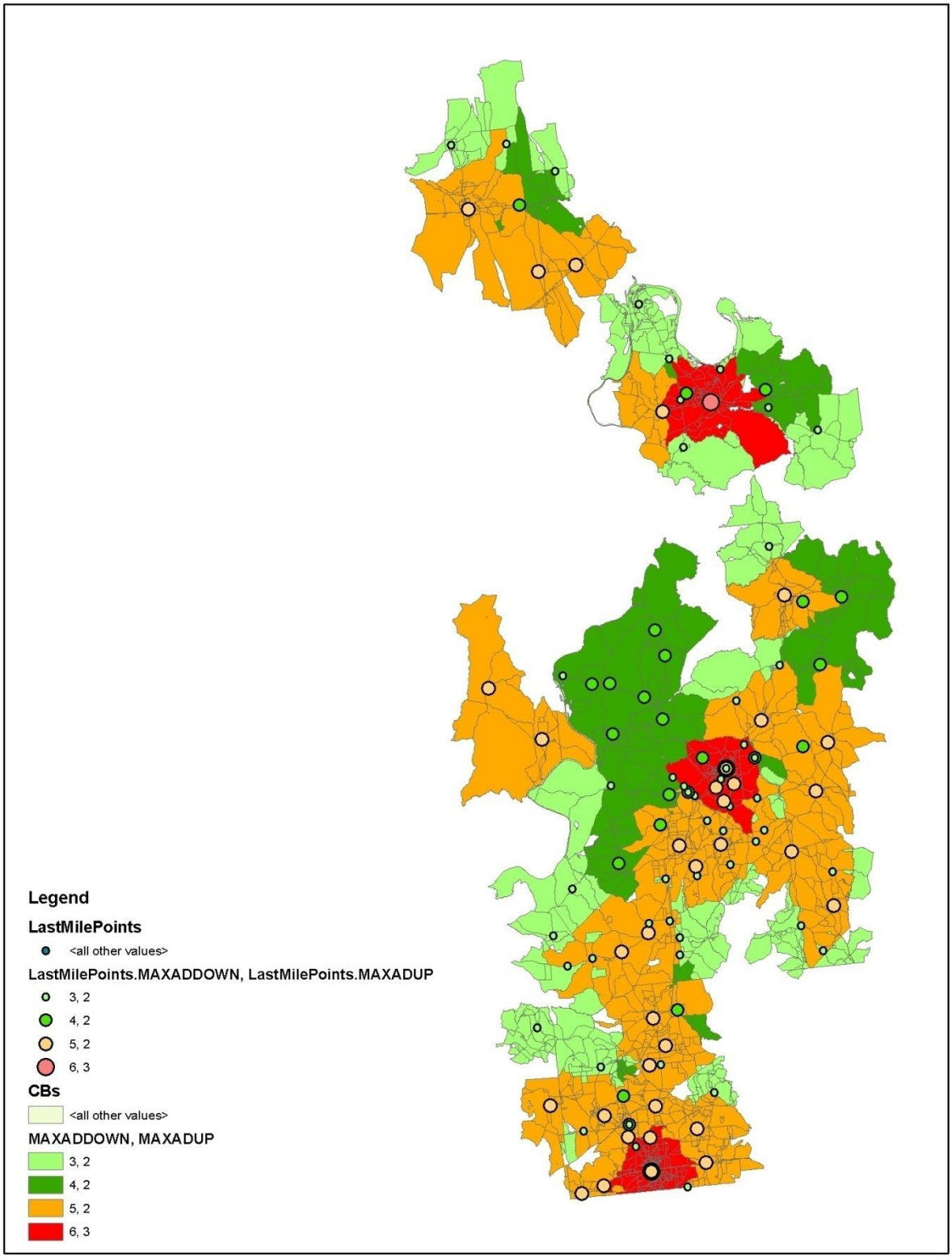
Figure 10-Coverage derived through road paths

In response to Provider feedback we revised this process to include a larger variety of TIGER road types. In Round 1, unimproved roads were not used. In the current submission -- particularly to improve estimates in areas bordering parks and public lands -- a wider class of TIGER roads was used.[14] We still get concerns from service providers about missing road segments and incorrect centerline appearance.

The segment level coverage is easily extendable to derivations of Census block level speed. The figure below shows the attributions of block level speed based upon the Maximum Advertised Speed available from a DSLAM. Although the methodology isn't perfect, it does provide insight into the value of granular infrastructure data.

[14]Only TIGER features of MTFCC type S1100 and S1200 were excluded from use.

Over time we have seen an increase in the number of providers submitting this type of data for our use. Our sense is some providers find plant level data easier to generate and are satisfied with the results of derived coverage.


Legend
LastMilePoints
<all other values>
LastMilePoints.MAXADDOWN, LastMilePoints.MAXADUP
3, 2
4, 2
5, 2
6, 3
CBs
<all other values>
MAXADDOWN, MAXADUP
3, 2
4, 2
5, 2
6, 3

Coverage Derivation Using Polygon/Polyline Serving Areas

Broadband service providers sometimes submitted coverage in terms of served areas. This was either in direct geospatial formats, CAD files, or paper maps. The image below reflects a carrier's service area. Within that service area, there are variations in technology of transmission and served speeds. When polygons with speed data and technology of transmission were available, we used a spatial intersection to gather covered Census Blocks. In many cases, using covered Census Blocks resulted in a loss of the speed variation (sometimes the speed variation was at a level smaller than a Block and did not get picked up within a spatial query).

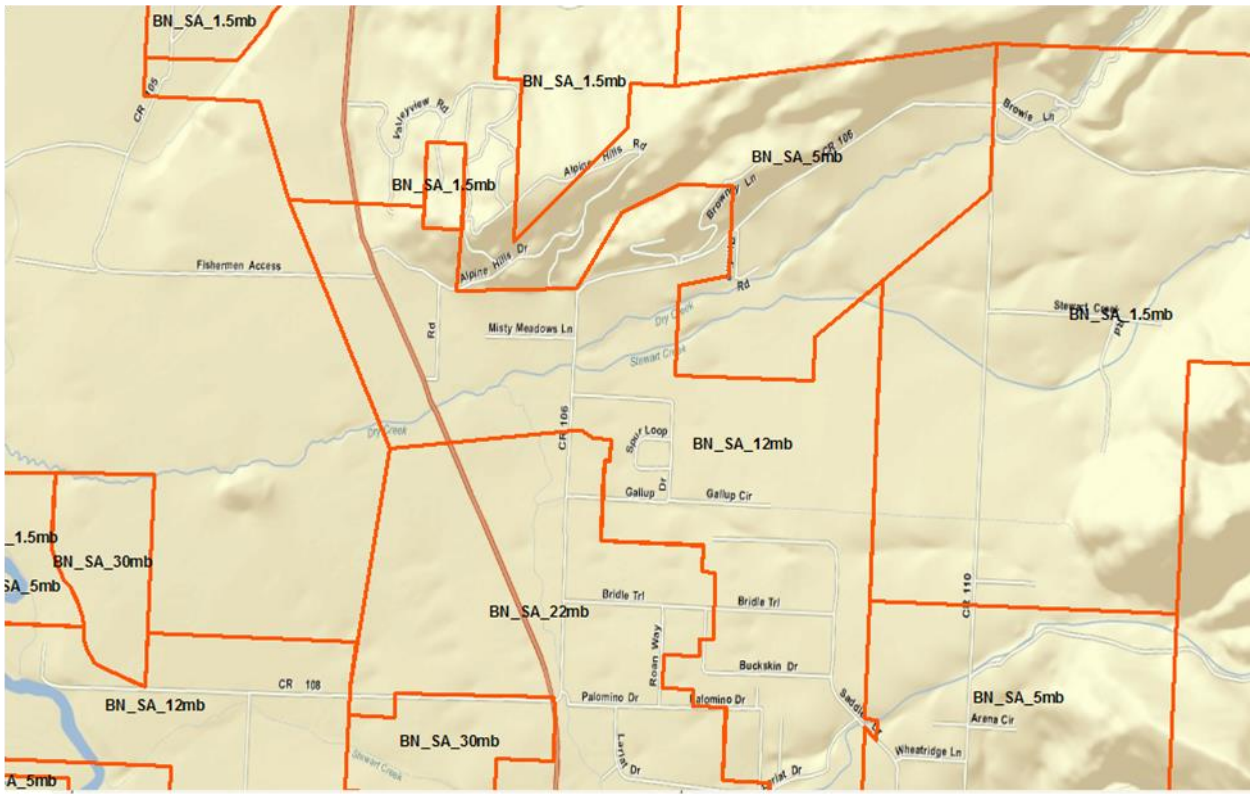


Figure 11-Coverage derived through serving area polygons

Although we cannot directly solve the loss of speed granularity due to Block shapes, we honor a business rule wherein we always select Blocks from the highest speed areas first, and then allow the lower speeds to select from the remaining Blocks. This is an arbitrary rule, but our feeling was that it should be a consistent selection, rather than an unordered selection.

Street Segment Derivation, Large Blocks

For those calculated Blocks greater than 2.00 square miles (large Blocks), we provided coverage in terms of covered street segments and corresponding geography.

With respect to segments we had four sources of data:

1. Covered large Blocks
2. Tabular street segments and address ranges for large Blocks

3. Geographic segments either with street attributes or without
4. Service area boundaries

A few providers only provided a list of covered large Blocks without corresponding segment information beneath the block. This provided the choice of either selecting all segments in the block, or none. Because we had little information from which to make the selection, we elected to be conservative and did NOT pass any covered segments to NTIA from this submission format.

Some Broadband providers submitted covered street names and street ranges. In these cases we performed a manual analysis trying to link to specific segment names and address ranges within covered Blocks. Sometimes this was a simple process because a provider used a TIGER derived street database. In other cases we could not determine the source of the provider's street data. Street and Address matching tended to yield a relatively good result (typically between 30% and 100% of possible segments in the Block), but was very time consuming. Where yield rates were low, our result was a shredded

segment coverage pattern, like the image shown below.[15]

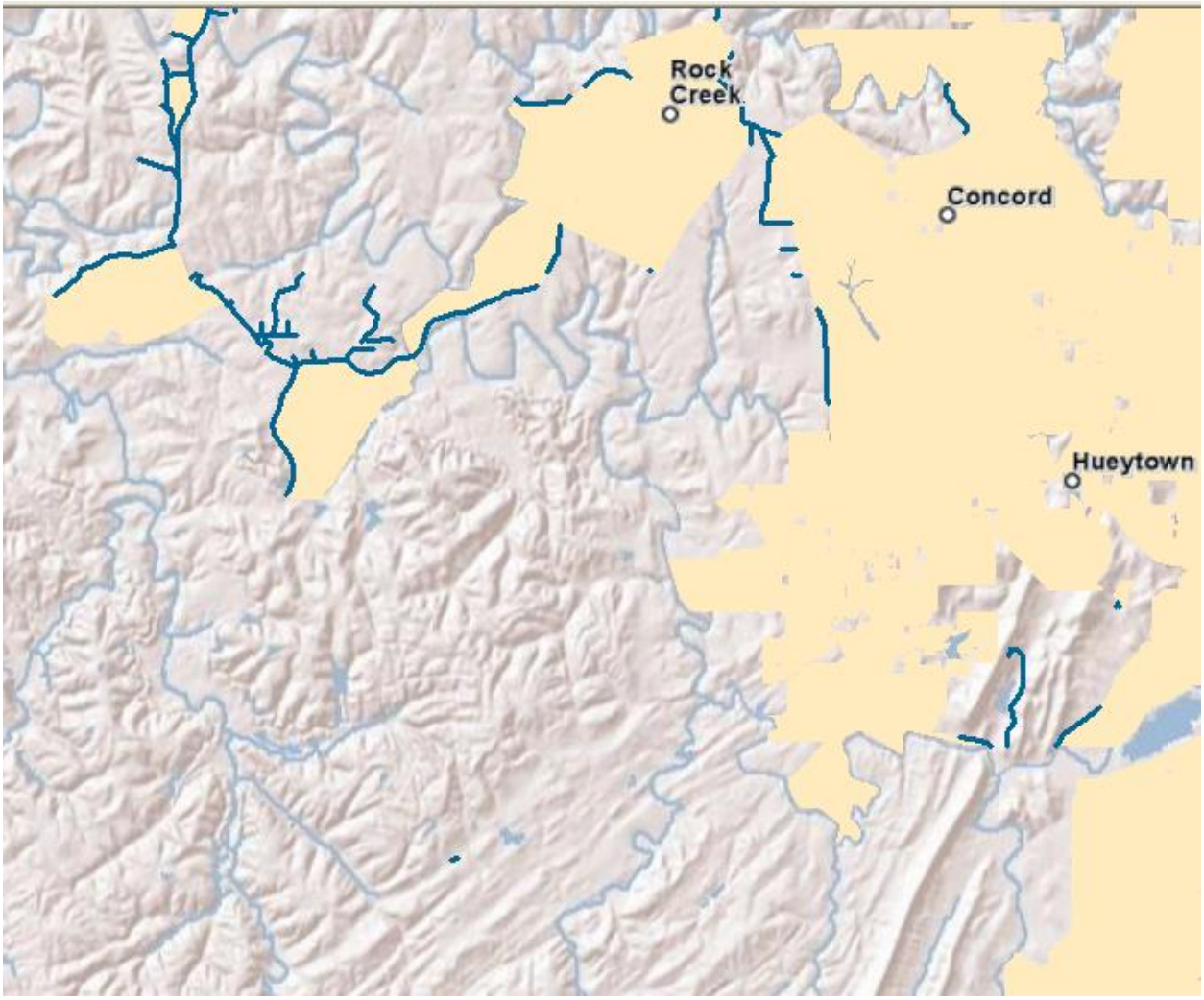


Figure 12-Blue road segments adjacent to peach covered small Blocks

A number of providers submitted geographic objects. In this case, our manual process was directed toward a conflation of data sources. The goal was to take provider submitted segments and put these segments in terms of our TIGER 2010 basemap. Although there is a trade-off in the accuracy using non-provider submitted segments, we felt it was more important to have a license-free road set that would edgematch our Block features, the TIGER state boundary and remain consistent with the block size standards we used for other providers. This is important for the appearance of the online maps, as well as potential verification work where we are attempting to judge a feature based upon its attachment to a covered small Census block. The figure below shows street segment input data.

[15] We continue to hear providers expressing concern that our request for either a geographic object or TIGER Line ID is beyond the scope of the NOFA clarification. Therefore, they cannot supply additional information to us.

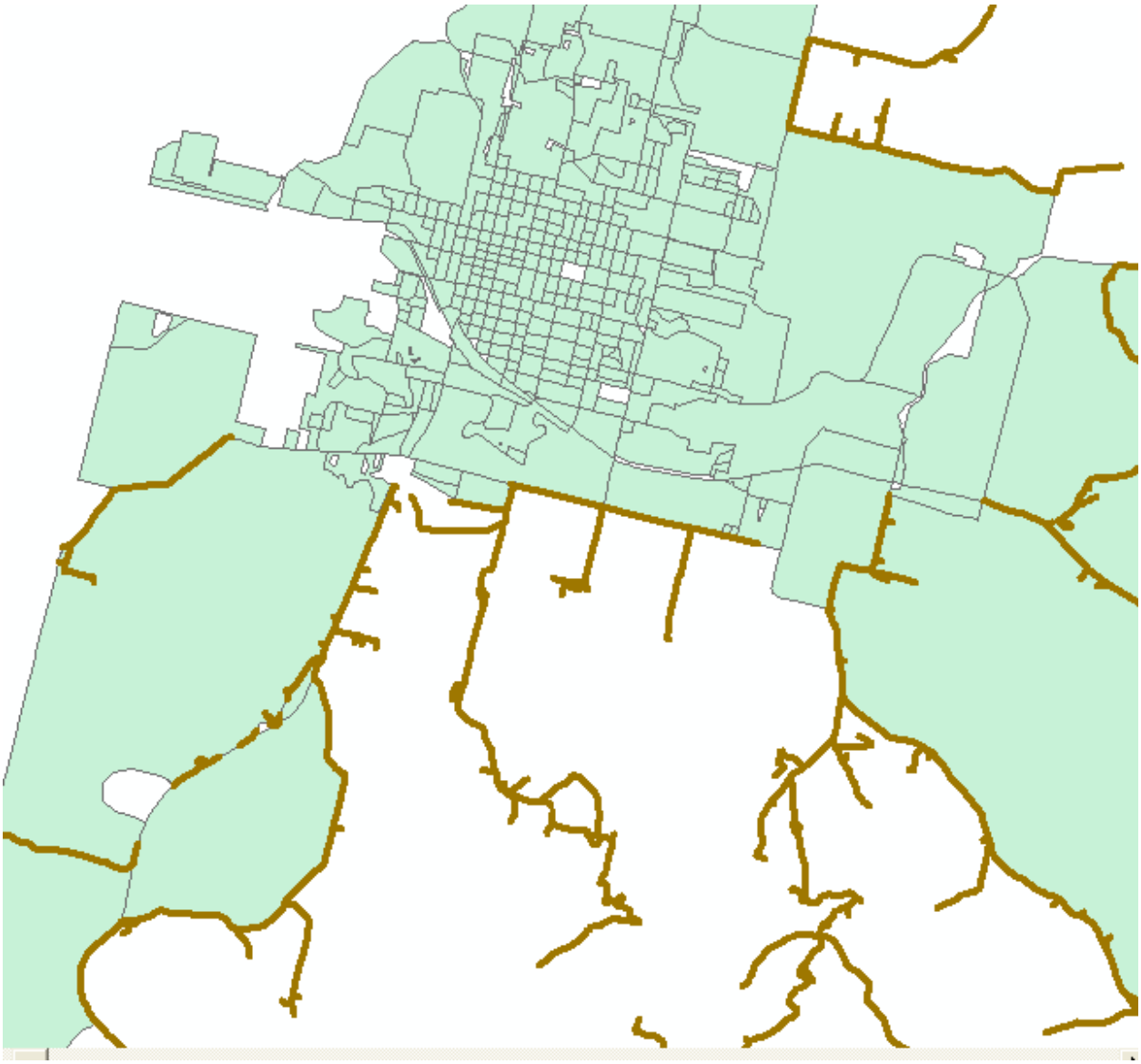


Figure 13-provider Submitted Street Segment Objects. The segments don't edge match the Blocks nor are they continuous.

The figure following demonstrates the same area after the conflation process. Blue segments are the conflated TIGER roads which will be passed to NTIA.

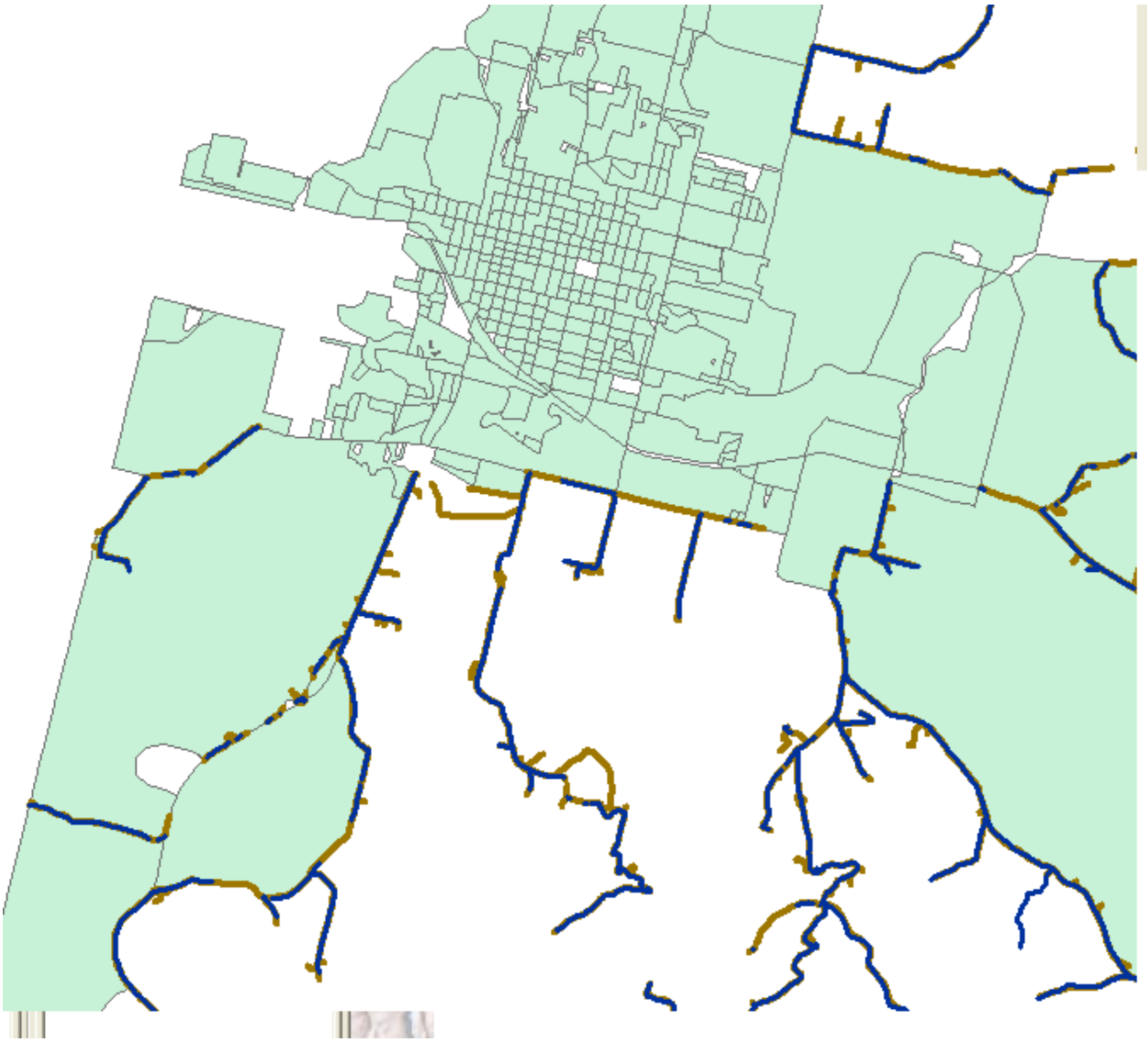


Figure 14-provider submitted segments in gold, selected TIGER in blue—Conflation result; in many cases what was a continuous segment is made discontinuous because even with a distance buffer the TIGER segment doesn't always intersect the provider segment

The final segment process was used when we were supplied with a Broadband covered area polygon. In this case, we found the segments within covered areas and eliminated those segments inside of Blocks less than or equal to 2.00 square miles.

Because there was more control over the format of the inputs (we knew we had a boundary and were working with TIGER segments), this was an automated process that followed this general format:

- Select large covered Blocks by provider ID (from updated Large Block table)
- Select TIGER 2010 road segments (MTFCC like 'S%') that face (CB = CBLeft2010 or CB = CBRight2010) covered large Blocks for provider

- Select segments as distinct records, max speed with corresponding technology, join in feature names, export selected records to temporary DBMS table
- Join TIGER roads feature class to temporary table on TLID
- Select covered segments (Python script)
- Select service area polygons for provider
- Clip selected facing segments with selected service area
- Export clipped segments to staging feature class, keyed by providerID

In this figure, orange represents covered small Blocks; black lines are covered segments in large Census Blocks (light blue). The service area boundary is shown in grey. Based upon feedback from providers, we have elected to clip segments at the end of a coverage boundary.[16]

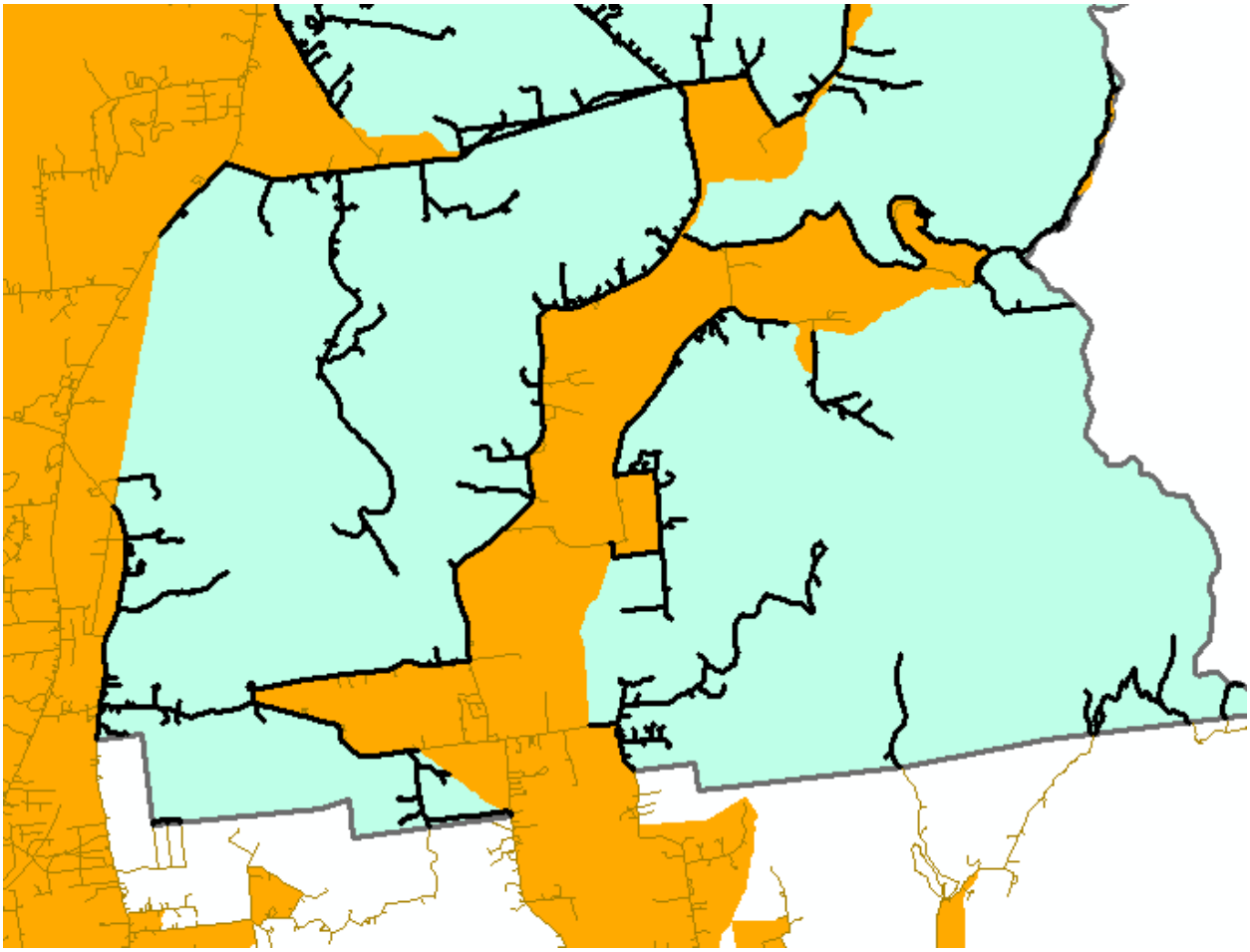


Figure 15-Output of the Segment Process

Wireless Coverage Process

In general, most providers of mobile Broadband submitted coverage information in a NOFA-compliant format. Other than attributions for spectrum and speed, little was done to this coverage.[17]

[16] An outcome not discussed here is how to handle address ranges on segments. As NTIA has asked for a Min and Max on the segment, deriving theses values for clipped segments is very problematic. Also the prevalence of alphabetic characters in addresses makes the min/max selections very arbitrary. We are grateful that addresses are nullable data elements.

Per Program Office direction, LinkAMERICA followed up with wireless providers where we determined that submitted data did not edgematch TIGER 2010 state boundaries. For the most part providers were unable to submit coverage data that edgedmatched as requested. In this case, we left the submitted data alone and did not perform any adjustments.

For providers who clip lower speeds out of higher speed coverage areas, we follow up and attempt to get revised coverage data.

LinkAMERICA continues to make aggressive efforts to bring additional WISP coverage into the NTIA dataset. For the most part, our outreach was with providers who were unable to supply sufficiently granular data in the past or those that could only submit wireless address points which is no longer a valid submission format. As stated earlier, we also work with third party service providers to getter coverage information.

Fixed wireless providers generally either supplied coverage information or infrastructure from which coverage estimates could be derived. Many allowed us to use their tower locations, antenna heights and direction/spread of coverage to derive a line of sight coverage estimate. In our experience, this is a conservative and reasonable derivation of coverage.

Some wireless providers submitted RF propagation studies. When this was done, there was a request that the signal strength be removed from coverage data. The request was honored. We note that some providers are very careful in that their coverage is an estimate of the probability of receiving an upstream link to their network. It is not intended as a depiction of any particular speed availability.

Other fixed providers were able to supply us with hand drawn maps or polygons/polylines drawn in Google Earth format. In these cases we did our best to georeference and verify the coverage areas with the WISP.

When we received coverage information in KML format, like the image below, we accepted the data as it was presented to us as the submitted coverage patterns were used in the provider advertising.

[17] Some polygon data did exceed the node count threshold. In these cases, data was rasterized to 100m cells and then converted back to polygons. The polygons were dissolved to multi-part geometry. This addressed the node count concern.

As the image above shows, in some cases we were provided hand-drawn coverage, as well as infrastructure. Instead of estimating their coverage using a line of sight or RF study, we elected to stick with the provider's supplied information. Our decision was guided by two primary factors:

If the provider is advertising using this coverage they must have specific confidence in its accuracy. If the provider can supply coverage, as well as infrastructure that reasonably supports the coverage, there is a very high likelihood in the accuracy of the information. Second the use of this coverage pattern provides an objective standard to verify against.

The downside, of course, is the polygon shown on the map may not represent our notion of how wireless coverage should appear.

In general we note several interesting trends in the wireless data. First, we can be successful in increasing the amount of WISP coverage when we aggressively pursue WISPs. This means we have to be willing to accept data on their terms and convey it into SBI formats. Some of our WISP submissions have taken over 12 hours to normalize into SBI formats. Second, we have to accept that some WISPs will not be able to supply FRNs. Third, there appears to be some variation on how the NOFA coverage definition is met. In other words, there seems to be a disparity on the necessary link budget necessary (e.g. -80 dB, -98 db, -120 dB, etc) to provide the appropriate quality of service for data services to be provided at a location/inside a location. Fourth it was very difficult getting providers to identify spectra used for

Broadband data services[18]. We are unsure if this is a competitive concern, or if the same coverage pattern is yielded for multiple frequencies. Typically, the spectra returned were those that a provider was licensed for. At this point, we have no reliable way to locally determine what set of frequencies are used to provide Broadband data services in a local area at a specific point in time.

Service Address Point Process

A handful of providers have requested that customer level, service address point data be submitted to NTIA. In these circumstances we have done minimal processing to preserve the provider's intent with this deliverable and not bias downstream NTIA use.

Our verification included checks against commercial or Public Utility/Public Service Commission exchange boundary maps. Points not contained within three miles of a boundary are not submitted to NTIA. The percentage of excluded data varies cross providers, but it tends to be under 1% of the total submission.

We retain from the provider the provided latitude and longitude, as well as Census block. For some coverage data, if a provider is unable to supply a longitude, latitude or Census block, we fill in these attributes. In those circumstances where we do not have a Census block, but we do have a longitude and latitude, we accept the given longitude and latitude and use that as the basis for our Census block assignment.

With point data we have tested for comparable geocoding success rates but do not overwrite provider information.[19] From this type of analysis we note the amount (usually little more than 10%) of addresses that seem to locate with less than street segment certainty. Deriving a thematic representation of the points on speed also illustrates some of the locational certainty issues in this point level data.

Coverage Estimation Process

Although the derivation of Broadband coverage into Census Blocks, street segments, or wireless coverage files is, in itself, a bit of an estimation process, there was an explicit estimation process required in cases where a Broadband provider either refused to participate in our survey, or provided such a threadbare submission that no carrier-based coverage information could be gleaned[20].

We typically resorted to three possible estimation paths.

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[18] One provider responded by email, "This mapping program is to provide the coverage area for Broadband provided by a company. Not to keep a detailed account of every aspect of a companies (sic) network."

[19] We will make a second geocoding pass on locations with no longitude or latitude from provider. We typically pick up ~5% from our second geocoding pass. Typically the issue tends to be address quality but also difficulties in geocoding in very rural areas.

[20] We report estimated submissions to NTIA as a non-responsive provider but we have data in the submission for them. This is the reason for datapackage.xls entries which are non responsive but contain submitted data.

For Cable (HFC) providers who did not provide any coverage information, we fell back to Media Prints data. Rather than using the entire Census Block Group gathered by Media Prints, we used only those Census Designated Places carrying the same or similar names to the Media Prints p_com field. Our reasoning was that Cable systems tend to be franchised on a municipal or at least administrative basis so the coverage will likely follow a governmental boundary. As a general rule, cable infrastructure is not available in the public domain[21] and what could be found was poor in quality and difficult to ascertain for validity.

For DSL providers who did not provide any coverage information, we estimated road-based coverage from their Central Offices[22]. We only used Central Offices that showed evidence of DSL or fiber-based services in the NECA 4 tariff. Road-based engineering areas were derived via ESRI Network Analyst to 18kft. These segments/boundaries were clipped to commercial wirecenter boundary edges.

For fixed wireless providers who provided no coverage information, we relied on their public websites to derive coverage maps. When these maps were available, we georeferenced them and tried to use the outer polygon boundary to represent their serving area. In other cases, when only a tower could be provided, we used a viewshed analysis and estimated line of sight coverage at 10mi per tower[23]. Because much wireless propagation is driven far below the Census Block and much engineering information isn't known (frequency in use, polarization of the signal, coverage pattern of antenna(s), local terrain/land cover) this was the most complicated group to estimate.

For providers who refused to provide spectrum information, we defaulted to unlicensed for Fixe d Wireless and NTIA category 1 for mobile wireless.

Speed

Speed attributes are reported both at the block (typical) and higher levels (maximum advertised and subscriber weighted). We note that in many cases, providers did not supply typical or subscriber-weighted speeds. In some cases, it appears--although we cannot verify--that their maximum advertised speeds were used to populate typical speed columns.

We do have limited testing data on reported speeds, but we have been careful to not use our typical reported values with carrier-provided information. If we do not have a speed value from a provider, we report an empty value.

Several service providers claim they do not have data on typical speeds available, but estimate a 20% overhead factor between the advertised speed and what may be experienced by an end user.

[21] The team tried to use data from the FCC Coals system and 321/325 fillings but this seemed to be a bit non-uniform in quality.

[22] Central Office location was derived from GeoResults. Wirecenter boundaries also came from this commercial product.

[23] In some cases we had an approximate radius of coverage but no height. In this case we used a 50' height estimate and then clipped the coverage to the provided coverage range. We also clipped wireless coverage to honor state boundaries but did not look for providers serving coverage with out of study state facilities.

As a general rule, in circumstances where a provider supplies a range of speed attributes, we assign NTIA categories based upon the midpoint of the range. We follow this rule unless we can determine other grantees are handling the same submitted information differently.

To support NTIA program office requests, we have also modified the structure of the Service Overview table. Even if Maximum Advertised Speed is supplied at the market or county level, we push that speed down to the contained Blocks. The only records that remain in this table, will be those wireline records with either a non NULL nominal weighted speed or ARPU value.

Middle Mile

Middle Mile information was collected directly from providers via survey or interview. Middle Mile is a "chicken or egg" type of challenge in that it is possible to verify that the infrastructure exists, but extremely difficult to know what the site is doing without engineering level assistance. Although most providers submitted "something," there was a significant variance in what that "something" represented.

The purpose of this section is to record some of the comments and questions we have received about Middle Mile. We hope this provides better context for our data submission.

Within the NOFA, Middle Mile was defined as (a) a service provider's network elements (or segments) or (b) between a service provider's network and another provider's network, including the Internet backbone. (Collectively, (a) and (b) are "middle-mile and backbone interconnection points.")[24]

Given the existence of the "or" in this definition, providers submitted a variety of information. Based upon the NOFA example, several fixed wireless providers interpreted Middle Mile in terms of the connection points from their towers to their own serving backhaul location. The topology was commonly Microwave from their distribution towers to their NOC. The NOC and towers were listed as the Middle Mile points. This seems to be consistent with the first definition clause (a).

Telephone, Mobile Wireless, and Cable providers tended to remain either silent on the question, or would provide a single location in which Internet peering occurred (clause b). A number of participants explained that the NOFA was quite ambiguous with data traffic moving back and forth over both TDM and IP networks--it was unclear where the distinction should be drawn. As a general rule it seemed like many providers listed a single location where Internet Peering occurred.

A number of providers refused to answer the question on grounds of confidentiality[25]. Others would not disclose as their Middle Mile points are not owned--another company provides the physical and

[24] From http://broadbandusa.gov/files/BroadbandMappingNOFA(FederalRegisterVersion).pdf at 54, visited March 28, 2010

[25] As received in email 9/30/10, "Due to security concerns and the risk of public disclosure of highly sensitive data, whether inadvertent or otherwise, ***REDACT***response to the Middle Mile and backbone interconnection request is limited to publicly available information available on {remainder not included}"

electronic connection to their network. In other words, the entity providing Broadband is not the entity providing Middle Mile.

Additionally, based upon the new Provider Type classification of "other," we have started to integrate points provided by Broadband service providers not meeting the NOFA definition. This includes POP locations and aggregation points for public / private networks.[26] Within a given submission there were two final attributes that tended to concern respondents. First, speed should be measured in terms of only data capacity and what exactly is "data" (e.g., can/should you segregate out voice or video), and is the relevant capacity of the physical connection, channelized to a specific virtual circuit on their network.

Finally, a number of other providers were unsure of the height above grade measure (is this their floor, the street outside, etc). We seem to have a combination of height above or below grade, as well as heights above mean sea level (AMSL).

To the extent possible in our timeframe, we verified the location of a sample of Middle Mile points. Where we could see infrastructure that appeared to be consistent in location with other provider infrastructure, we felt that the location was accurate. In some cases, the point provided seems sensible (is on a road, near other equipment), but using imagery, we couldn't find a place where this type of connection could occur. This wouldn't be unforeseen, in that Middle Mile connectivity likely takes place in a protected environment much smaller than a standard Central Office installation.

Mobile Wireless Coverage

We have received mobile wireless coverage from most mobile Broadband providers in each state. At this point we have cleaned the geometry of the data and attributed it with spectra, NTIA speed categories and FRN as required.

Where possible, provider derived coverage has been reviewed for consistency against the commercial licensed product. To a limited extent we also use licensing locations and tower infrastructure to spot-check supplied coverage. This mode of verification remains complex, given the lack of facility-based information with mobile wireless.

Finally with respect to mobile Broadband services, we note several trends.

First LinkAMERICA used the NTIA supplied frequency tables to report speeds consistent with other grantees. In circumstances where a provider supplied a range of experienced speeds, we used the portion of the range consistent with the most frequently reported Grantee value.

Second where a provider reports multiple frequency bands in use but doesn't distinguish these bands by submitted SHP file, we submit identical geometries but attribute one geometry to each submitted spectrum value.

[26] As discussed in our readme.txt file, a number of middle mile points were lost in validation due to their location in adjacent state. This will cause a decrease in some providers relative to prior submission.

Third we are seeing a trend toward increasing Broadband speed. As of this writing, there is not consistency across providers in how they attribute the advertised 4G speed values. In other words, for some providers 4G means advertised speed categories increase. For other providers the speed value did not change.

Fourth, we have requested providers submit SHP files that are consistent with the TIGER 2010 boundaries. For the most part, providers have not done this. We have not modified the submitted data to impose the TIGER 2010 state boundary.

Verification

Data verification is an ongoing and evolving process. Clearly, with each new data submission there will be a validation process at hand and at the same time, our team continues to expand and improve the efficiency and effectiveness of our data verification routines. Consistent with the movement toward an fGDB export database and use of a data receipt script, much of our validation effort is spent in supporting the ETL processes into the required formats. In future data submissions we will continue our work to stabilize and improve the business process that normalizes provider submissions into NOFA formats.

Verification Methods Summary

Our overall verification standard is focused on the level at which we supply processed data to NTIA. This means that the vast majority of our verification process and resources will be focused on verifying provider identity, coverage, advertised speed and appropriate metadata for Census block's less than or equal to 2 square miles.

We believe three broad verification themes are important to consider

a) The first step of broadband service verification is a consistently applied market definition—we call this provider identity verification.

b) There is probably not a single dispositive method of verification. Rather, a number of verification approaches are needed to appropriately classify confidence in data submitted to NTIA.

c) Verification approaches tend to meld together. As an example a web survey is complimented by a phone survey but expert review and external data may be necessary to reach a final informed judgment.

The table below demonstrates the various methods used across each feature class submitted to NTIA.

	Data Types			
Verification Method	**Census Block, Road segment or, address specific service**	**Mobile wireless service availability**	**Middle mile infrastructure locations**	**Community anchor institutions**

	availability			
Provide/Subscriber Identity Verification	METHOD USED	METHOD USED	METHOD USED	METHOD USED
Internal data consistency check	METHOD USED	METHOD USED	METHOD USED	METHOD USED
External data consistency checks	METHOD USED	METHOD USED		
Carrier confirmation	METHOD USED	METHOD USED	METHOD USED	
Public review	METHOD USED	METHOD USED		METHOD USED
Anchor institution review				METHOD USED
Expert review	METHOD USED	METHOD USED	METHOD USED	METHOD USED
Telephone sampling				METHOD USED
Purchased Datasets	METHOD USED	METHOD USED	METHOD USED	METHOD USED
Developed Datasets	METHOD USED			
Web-based surveys	METHOD USED	METHOD USED		METHOD USED
Field Surveys	METHOD USED	METHOD USED		METHOD USED

The following table defines each of these methods and provides a summary of why this method is used, and the value we gain from it.

	Definition	**Methodology**	**Purpose**	**Benefit**
Provider Verification	Provider verification is the process of assembling a	Provider verification involves combining multiple data sources,	Without a consistent understanding of the provider	The main benefit of this verification process is understanding who is providing broadband

	broadband provider database, determining which providers are properly classified into SBI eligible providers and developing contact information.	interviewing providers and classifying the broadband provider type.	'market' it is impossible to appropriately classify the coverage data. It is also impossible to explain to consumers of the data why a given provider is or isn't available in the submitted data.	services, are the broadband services NTIA compliant and how do you 'contact' this provider (Name, DBA, FRN, Holding Company)
Internal data consistency check	An internal data consistency check is a validation measure across at least two dimensions. First is the provider data consistent with prior submissions. This would be an examination of this submission relative to a prior submission. Second is this submission consistent with the technical specifications of the service offered.	Most of this validation is performed using our spatial databases and running queries that compare submissions. We also use a similar set of queries to isolate transmission of technology outliers. These would be data sets which offer speed technology combinations which are unusual relative to other data received across all states.	The purpose of this type of validation is to understand how things change over time and why. It also helps inform us for circumstances where we have data points which appear to be outside of the norm. If these outliers are detected, they can be pursued directly with the provider.	The main value is understanding why something changes and providing an opportunity to engage with the provider to understand why there has been a change.
External data consistency	An external data consistency check is a measure of	External validation can be performed by verifying	We don't believe a single,	External validation provides an external measure of data quality

checks	the provider data against external sources (not from the Provider). The distinction between internal and external isn't pure, but our typical experience has been that External checks involve the acquisition of additional data sets and a comparison across multiple sets.	supplied coverage against third party data sources. An example would be to test provider claimed DSL Census blocks against a commercial source of exchange boundaries. Wireless coverage is also compared to radio locations.	exhaustive third party data set is available for validation. We do believe a combination of external datasets can be used to inform and help filter out the false positive cases from provider data. We also note that the external data appears to diminish in accuracy as the area of analysis becomes less urban.	assessment not influenced by internal data sources. It can be one of the more effective means of isolating false positives in submitted data.
Carrier confirmation	Carrier confirmation is the process of sending processed data back to the service provider to ensure that translation into NTIA formats is fair and appropriately accurate.	We use two techniques to accomplish this. First a provider's data is summarized in a tabular format. This lets the provider quickly verify firm information (FRNs, DBAs, counties served). We also develop two sets of check maps. One is a PDF version and the second is a	One of the more critical steps in broadband mapping is translating carrier supplied data into NTIA formats. Providing verification deliverables to the service provider (carrier) is an	Carrier confirmation gives the provider information on how their data will look when submitted to NTIA. It also helps short circuit complex problems like online map display problems—which tend to come from FRN issues or incorrect data entry. This process also helps to strengthen the sense of ownership and participation with

		Google Earth (KMZ) version. Both versions display the NTIA reported coverage and speed. A different map is developed for each technology of transmission	important external feedback process. Several providers also ask us to repeat this process before data are submitted to NTIA so they can see what will be submitted to NTIA.	providers.
Public review	Public review is the process of collecting structured feedback from the general public in a manner which can be analyzed and used to improve/validate the submitted data.	Currently we use an online map 'layer' which provides consumers the ability to feedback about the coverage and provide in depth information about their concerns. The maps are also discussed within the context of planning teams within each state. We receive feedback from these meetings.	As with other crowd-source approaches the intent is to allow the general public to feedback and improve the displayed and submitted data.	The benefit is to provide feedback and also display the comments of the general public. As a mechanism for validation the key is to develop feedback data which is structured in way that informs the mapping process.
Anchor institution review	Anchor institution review is targeted surveys intended to better understand the Anchor Institution	We have used three methods to verify anchor institution data. The first is a targeted series of	As Anchor Institutions represent a different class of coverage information as	Because CAIs represent a very distinct stakeholder community, building identifiable connections between the SBI program and the anchor

	broadband market.	telephone calls. The second is specifically targeted mailers. The third is direct interviews with stakeholders. Schools for example, may have someone at the state level who maintains information about broadband connectivity.	well as a very different type of end user, a focused stakeholder management, data acquisition and data review process is advantageous.	institution community is important. Tailoring a specific data acquisition/ data review process helps Anchor Institutions establish a reliable set of infrastructure benchmarks which they can use to fulfill their mission.
Expert review	Expert review is the process of using subject matter experts to review submitted or processed provider data.	The method of subject matter review will be dependent upon the type of data in question. In the past this has taken the form of conversing with a wireless engineer to ensure that the coverage pattern appears plausible for a given technology. It may also involve a cross check on data from a second source—can this type of middle mile infrastructure support the maximum advertised speeds in this area? SME validation is also helpful trying to	The purpose of expert review is to get a second opinion regarding some aspect of submitted or processed data. Given the large number of submission formats and innovative ways to supply broadband, it is always helpful to have multiple sets of eyes available to reduce errors from misunderstanding.	The most significant benefit is to have a secondary source for back checks and verification. For the most part expert review is from an engineering or deployment resource. Expert review also helps support process transparency so there isn't a closed GIS driven process making all the decisions.

		understand ambiguous information in submissions.		
Telephone sampling	Telephone sampling is the process of using targeted phone calls to verify aspects of submitted or processed data.	Telephone methodology tends to be consistent across the type of data being verified. A subject location or individual is identified. The phone number for that location is identified and a call is placed. The person performing the survey asks a scripted set of questions and records the responses in a database. For example, our team produces a survey to develop and monitor access and use trends at a regional level.	The purpose of a telephone survey is to gather in depth information from a targeted respondent. We would likely use telephone survey for targeted purposes--either clarifying anchor institution data or randomly polling consumers to better understand attitudes.	The primary benefits are to develop in depth information as well as surveying a large number of respondents regarding opinions or behavior. Phone surveys tend to be more helpful to survey attitudes or to find out location specific information. Telephone sampling is used in our CAI and consumer surveys.
Purchased Datasets	See external data consistency checks.			Also note that not all external data checks must be purchased. For example Census data could be used for an external consistency check but it is freely available for download.
Web-based	Web based	In the case where a	The purpose in	The benefits of web

surveys	surveys can involve three dimensions. First a web survey (a form available to be filled out on the Internet) can be used to supplement and better understand consumers. A web survey could be a compliment or a substitute for a telephone survey to target a specific demographic (a web survey can also be part of a social media campaign). Further web surveys can be used to verify provider information.	web survey is a compliment to phone or in person, a survey instrument is developed and then respondents are invited to complete the form. In the case where a survey is a mechanism to gather additional information from provider web sites, this could take the form of manual queries (looking for address listed in a Census block) or automated scraping where information is pulled from a website via a specific web application. We currently use both approaches depending on our goal.	all cases is to gather additional information via the Web.	survey are its relatively low cost as well as the ability to gather specific information into a form that can be easily used by downstream work processes.
Field Surveys	A field survey is sending a team of skilled participants into the field to verify submitted data or sample some aspect of the environment in a given area.	Field survey methods involve assigning a field team, equipping them with data acquisition hardware, ensuring they have a consistent skill basis and recording	Although expensive, field surveys are sometimes the best way to verify information such as provider equipment	The benefits to field work are significant. They can help us better understand the exact phenomenon in a particular area.

	observations. To date most of our field survey work has been in engaging CAIs into the process. In Q2 of year 4 we are preparing to launch an app for download to mobile devices with the intent of testing mobile wireless speed and access.	presence or the strength of a wireless broadband signal.

Verification Standard

Verification is a broad term, but in our definition it boils down to determining if broadband coverage is in the right place. For a given provider, the question is whether the coverage is assigned to appropriate Census Blocks, road segments or area features. Coverage verification can be further broken out into two distinct classes:

Technology verification, which is determining if the provider is listed with a technology consistent with their marketing information.
Speed verification, which is determining if the speed supplied for that block, road segment, point area file or market area is consistent with the technology and the marketing information received.

The final verification dimension is consumer feedback and crowd-source verification. This is a dynamic set of steps we are beginning to implement. One side of this is responding to consumer concerns. The second is using the crowd sourced data to validate provider claims and, if appropriate, update the map and the underlying data.

At this stage, our working hypothesis (confirmed by our experience) is that there will not be a single measure to indicate broadband coverage availability in a Census block or along a segment. From prior work, and examining our current provider submissions, we believe that there is too much variation below the submitted record to make a single binary yes/no indication. Rather, there will be a series of measures that combine to provide qualitative confidence (a classification scheme) in our indication of Broadband availability at the block, segment, or wireless polygon level. We believe such a qualitative classification scheme is both relevant to and supportive of NTIA interests, as well as the interests of our end-user community – that is, the states and citizens we serve through this program.

The intent of this section is to illustrate why our team is moving toward a particular verification methodology. Our team is learning as we go along, and will adjust and improve this thinking. But given our experience to date, this is our path. As stated above:

First, coverage verification is at the level of data submitted to NTIA.
Second, coverage verification is enhanced when there is a secondary measure of availability (such as infrastructure presence or serving area boundaries)
Third, given the limited resources of this effort, the most important coverage verification process to implement is the erroneous dispersion of coverage. These are the "islands" of coverage isolated by significant distance from other covered areas. In other words, Broadband Internet likely doesn't exist far away from other areas with Broadband Internet access supplied by the same provider.
Next we present several examples which illustrate the complexity of coverage verification.

The first example is taken from a gentleman who requested a map change in Alabama. His home is near the yellow dot. The darker grey Blocks are covered Census Blocks. The black lines are covered road segments. He cannot receive DSL from his incumbent provider, although his neighbors can. The incumbent carrier does have at least one structure in that block from which Broadband services can be provided; unfortunately his home is not served.

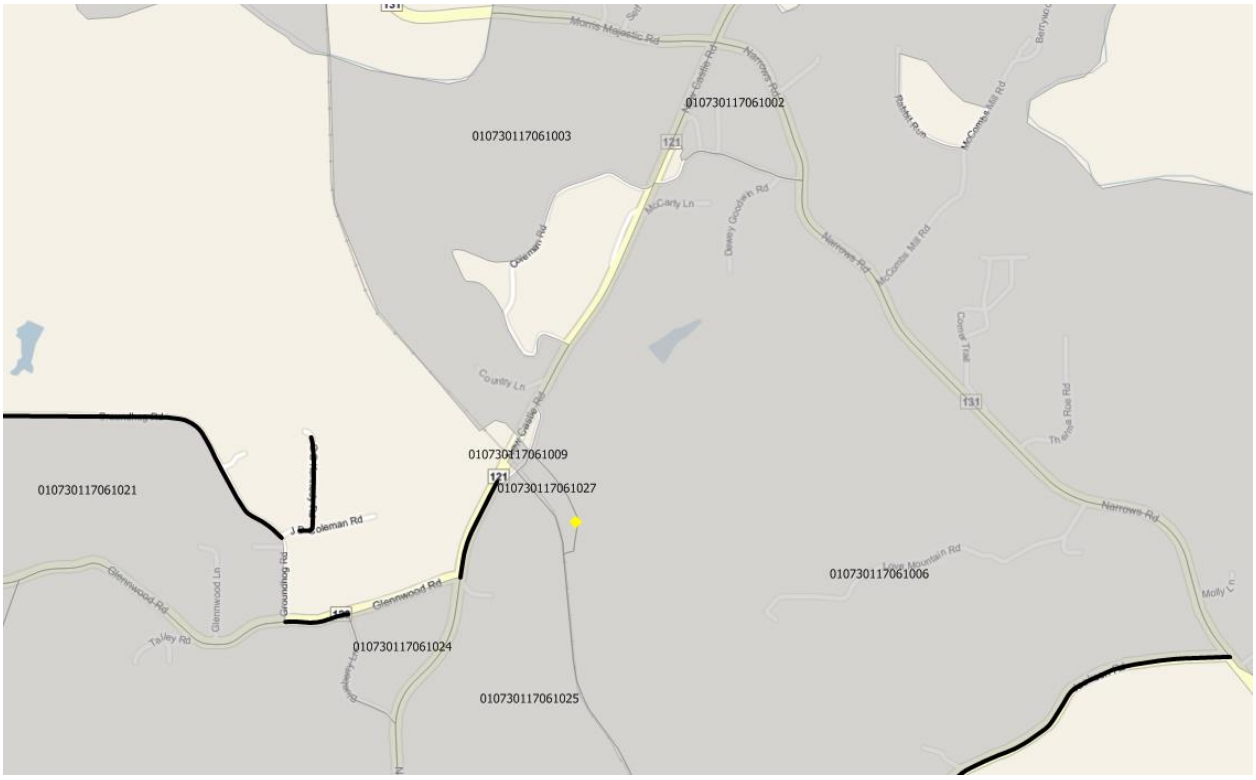


Figure 16--Sub block variation

Because the SBI program requires the depiction of coverage at the block level, the above map has been correctly generated. However, from the customer's point of view, the map is inaccurate. This requires

us to explain that the maps are not intended to be a structure-level qualification, at which point some consumers question the value of the maps when seeking service information.

Beyond this type of one-off structure-level qualification, sometimes, as shown below, we have even larger gaps in provided coverage. The image here shows an "outlier" block that could be an error, or it could indicate missing Blocks along a major road that should have been filled in. In this figure, the outlier block is highlighted in turquoise.

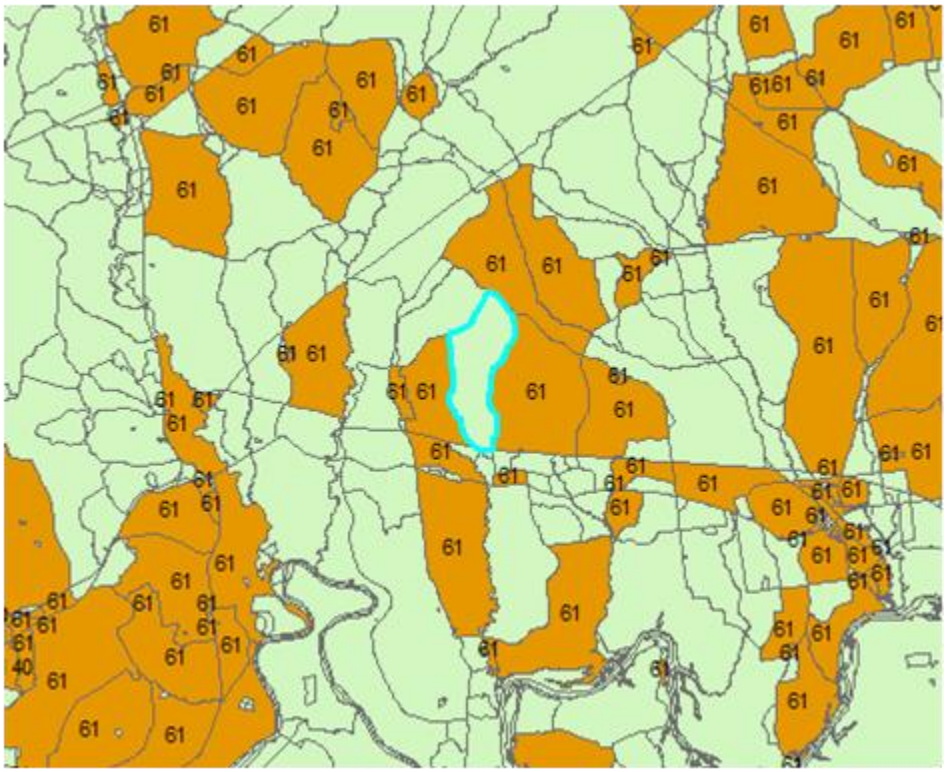


Figure 17--Dispersion in Submitted Data

In this particular case, we are faced with a different verification question. Based upon the properties of the neighbors, we believe this block should likely be covered (coverage interpolation,) but supplied data from the incumbent says otherwise. Although we don't have information to know how much of the data submitted to us is generated, our sense is that geocoded customers or plant are used. In this case the block dispersion could be the result of a side of the street assignment rather than an availability assignment. In other words the data may speak to where is working plant rather than where could service be provided in 7 to 10 days.

The next example shows where an interpolation process could require some adjustment. The figure below shows a town level view. There are some smaller Blocks that are likely covered by interpolation logic, but we also do not want to extend coverage beyond a franchise boundary as in the areas shown in a box on the bottom of the map.

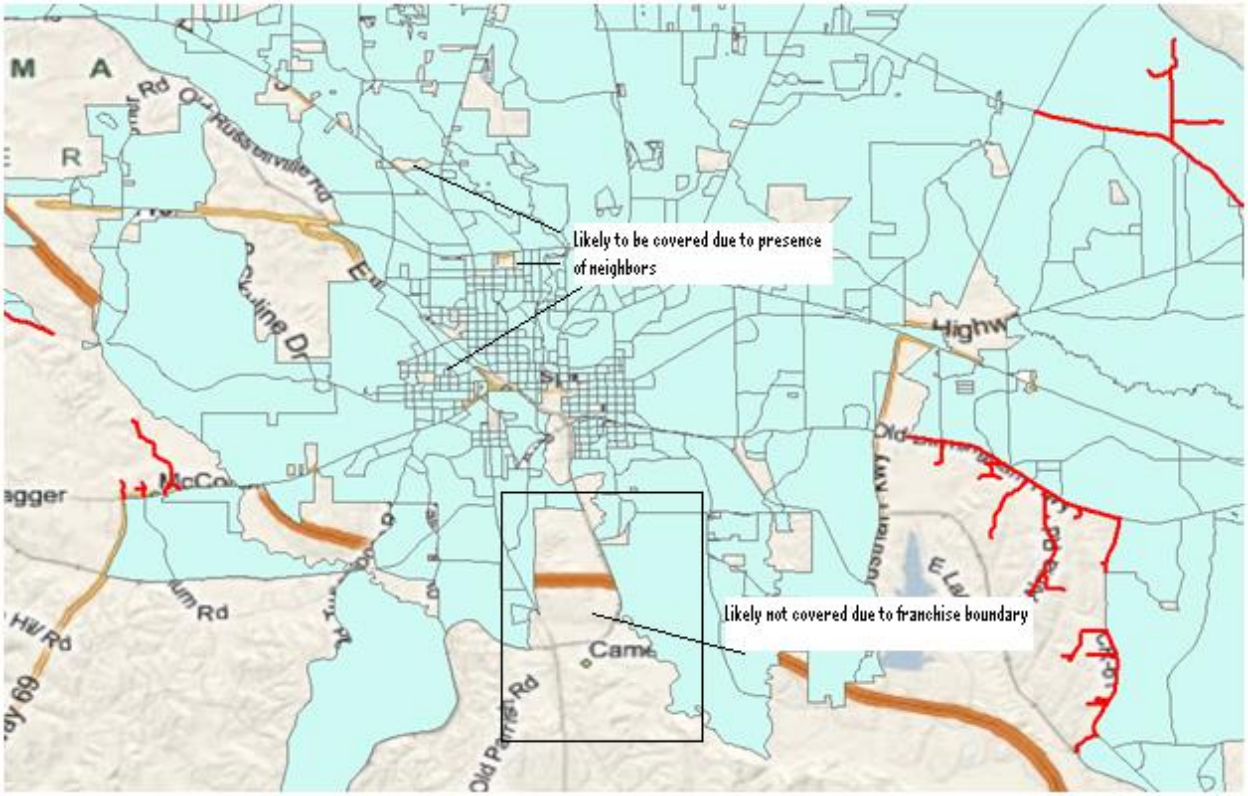


Figure 18-Where do you stop interpolating?

From what we can gather from some providers, the submitted data—data with consistently high degrees of dispersion or coverage holes—tends to come from geocoded billing records. In this paradigm, this means where there are no billing address points; service is not identified on a map. The interpolation verification question then takes on three dimensions.

First, if a provider has no customers in an area, how can we know if they would be able to provide service in a 7-10 day interval?

Second, if we use the properties of neighboring Blocks to interpolate coverage, when should we stop (e.g., at a franchise boundary, at a certain distance, etc.)?

Third, if we are comparing to a data source that examines coverage at a higher level (such as 477 Tract) do we use the Tract information to assign information block level coverage or do we use the tract coverage to filter out dispersions in coverage?

We continue to work with providers to get additional information to help us better understand and contend with this type of circumstance. However, we have not been entirely successful at getting franchise/service area boundaries that would address much of the issue.

The final map shows this dispersion problem, but to an even larger degree. This solitary large block is likely the result of a bad geocode, but we don't know, given the data that has been submitted by the provider and the "single customer in a block standard" set by the NOFA clarification.

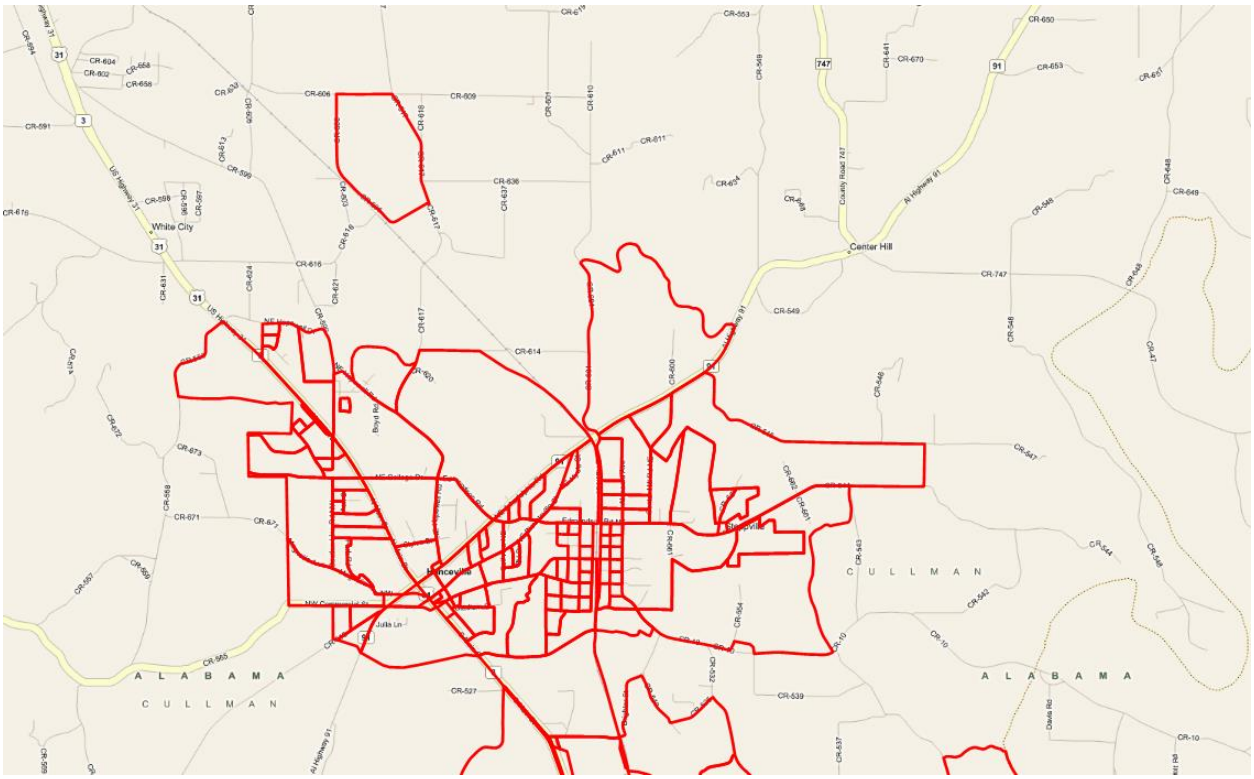


Figure 19-Dispersion in covered Blocks

Due to the fact that this situation is quite obvious in display, this type of problem is one that we are more aggressively trying to resolve. Where a single block has no neighbor offering comparable coverage and is a specified distance beyond an exchange boundary, our approach has been to filter these Blocks out. As of now, this filter is limited to incumbent xDSL providers because we have a good source of exchange boundaries.

The exchange boundary dispersion verification method breaks down when examining providers who are more likely to CLEC into neighboring territory. In the figure below, the black line represents the exchange boundary, while the continuity in the DSLAMs likely points to coverage extending along a road into another provider's territory.

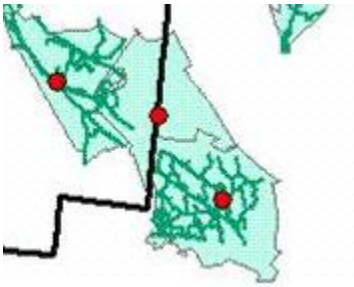


Figure 20--DSL Coverage outside of exchange boundary

In sum, the variability in our source data continues to suggest that our dynamic verification process is relevant, appropriate and evolving in a manner consistent with the overall program. And, as noted above, we believe the more meaningful outcome of our verification processes will likely be a series of qualitative indicators or expressed confidence levels. Our concern, as with the development of any sort of classification process, is how rigid we should make this classification given the variation in our input data and the varied perceptions of service providers, map viewers and down-stream data consumers.

Verification Work Process

To support our dynamic multi-factor verification process, we have implemented the following steps.

Between submissions our provider relations team works to analyze our current broadband provider ecosystem and capture any changes such as acquisitions, mergers or cessation of operations. They also remain in touch with providers who have indicated when follow-up is necessary. The team confirms that the providers who submit data are NOFA compliant. Given these steps they begin a survey and awareness campaign to get data submitted for the program.

When data is received, an analyst reviews the submission and any immediate questions or concerns are sent back to the provider as quickly as possible. We have found this gatekeeping step very helpful in making sure we understand the intent of the submission.

For all providers who submitted data to us in the prior round, the provider received both a tabular data summary and mapped output[27]. Prior to releasing the "check maps" to providers, we inspected each provider's coverage area. After this in-house review, we solicited a second level of feedback from providers and received a number of requested changes and corrections used in the development of the current dataset.

For those providers who submit only block or segment level coverage (i.e., in those cases where we have no infrastructure to test with) we test for coverage containment within known service boundaries. The intent of this validation step is to remove Blocks that are obviously erroneous.

We have also begun to perform a mechanical test against wireline providers. This is an examination to ensure that each feature submitted has some neighbor within 1 mile. We are testing this process to try to understand what the neighbor distance should be. This has proven to be a difficult process.

We also verify the submitted speeds against the typical speed ranges in the NTIA frequency tables. If we note a value outside of typical range, we ask the provider for clarification. These responses are recorded.

As mentioned in the sections above, we have implemented a check on dispersed Blocks, but we have implemented less with respect to coverage interpolation (holes in coverage). We continue to work on a

[27] For the verification of round 3 data, we submitted both PDF and KMZ (Google Earth) format check maps. Some providers prefer to work with the Google format as it supports easier modification. Others continue to submit marked up PDFs.

series of mechanical tools to assist with the inspection process but have run into challenges related to geographic basemap and timing.

As our submissions have moved online, we have also begun to benefit from crowd source feedback. In some cases this has helped us identify and fix errors in our underlying data. In other cases, as we have shared with NTIA, we have encountered some perceptual issues rooted in how the data are developed and modeled to comply with the NOFA. Depiction of uniform coverage in Census Blocks continues to be a challenge. Despite our best efforts to explain the full block coverage requirement, we continue to receive complaints that the coverage shown on the map is not accurate for a particular location within that block.

Cross Submission Validation

As part of our validation process, we compare submitted data from the current submission to the submission prior. This is an automated review in that all providers are examined in terms of submitted record counts and count/technology/speed combinations.

Sprint	**1**	**2**
80	**1**	**2**
3	1	1
6		1
StarBand Communications, Inc.	**1**	**1**
60	**1**	**1**
4	1	1
Starlite Computers	**1**	**1**
70	**1**	**1**
5	1	1
TDS	**27884**	**27716**
10	**27878**	**27716**
3	6219	4538
4	1761	2036
5	8778	8767
6	833	899
7	9023	10368
8	1264	1108
50	**6**	
8	6	
TEC - Cherokee Division	**1828**	**2012**
10	**1239**	**1352**
5	426	479
6	212	314

Our team reviews the changes to make sure the scale of the change is consistent with our expectations given modified survey data.

We then take a second pass at the same submission summary data to review any providers who will be flagged by the submission script. Again this comparison is made between the current and prior submission.

A	B	C	D	E	F
DBAName	TRANSTEC	MAXADDC	Round	RcdCnt	Lyr
AT&T Mobility LLC	80	7	7	1	WR
AT&T Wisconsin	10	7	6	33911	CB
AT&T Wisconsin	10	7	6	45	SG
AT&T Wisconsin	10	7	7	38	SG
AT&T Wisconsin	10	7	7	34213	CB

This second pass helps us to prepare documentation for our readme.txt file. It also helps us monitor where there have been large speed changes by provider. Where we do see changes , we contact the provider to understand how the networks in place support the speed reported. We also cross check advertising materials to make sure the reported speed is being actively marketed.

Consumer and Provider Responses to Deliverables

Here, we segue from internal verification to external verification. We view responses to our work product as a form of validation and verification. On the one hand, this gives us the opportunity to fix mistakes and then generate QA steps to make sure that the problem does not reoccur. We also learn how to improve what we are doing or better explain what we are doing to a community not always familiar with the NOFA and program office framework. On the other hand, listening and learning from this feedback helps us better target our mapping deliverable to meet the needs of our external customers. In this second case, external feedback not only provides feedback on perceived qualities (or lack of quality) in the data, it helps us to learn if we are developing data that is truly helpful to downstream users across a wide range of usage and intent.

At this point, our external deliverables take three forms: State Broadband Maps, data transfer to NTIA used for the National Broadband Map, and text format data requested by outside parties.

Online Map Experiences

With our State maps online, we continue to harvest viewer feedback and comments. Because an online map allows someone to zoom in far below the scale of the data, comments reflect sub-Census block concerns. While important to the citizens reporting these issues and to our Broadband planning teams, this level of data is outside the scope of our core validation process, which as noted above, is focused on the level of data submitted to NTIA.

There are several other themes that our team believes are important to share. These comments are actually quite helpful because they also improve our data processes to better meet the needs of map viewers. For example, we have invested significant time in harvesting more segments from provider data. Because the appearance of segments is so important, we are putting time into ensuring a visually appropriate edge match between the roads we harvest and the Blocks/roads we will show online. On a

technical level, we also believe that a good segment process will help us understand more about dispersion in the data, and what is valid versus what is not valid.

Our team reviews the online comments on a periodic basis.

Online Display of Consumer Feedback

We have completed development of a consumer feedback layer for our online maps.

The intent of the new layer is to show viewers the feedback of other map viewers. This layer went live after the Round 4 data was posted.

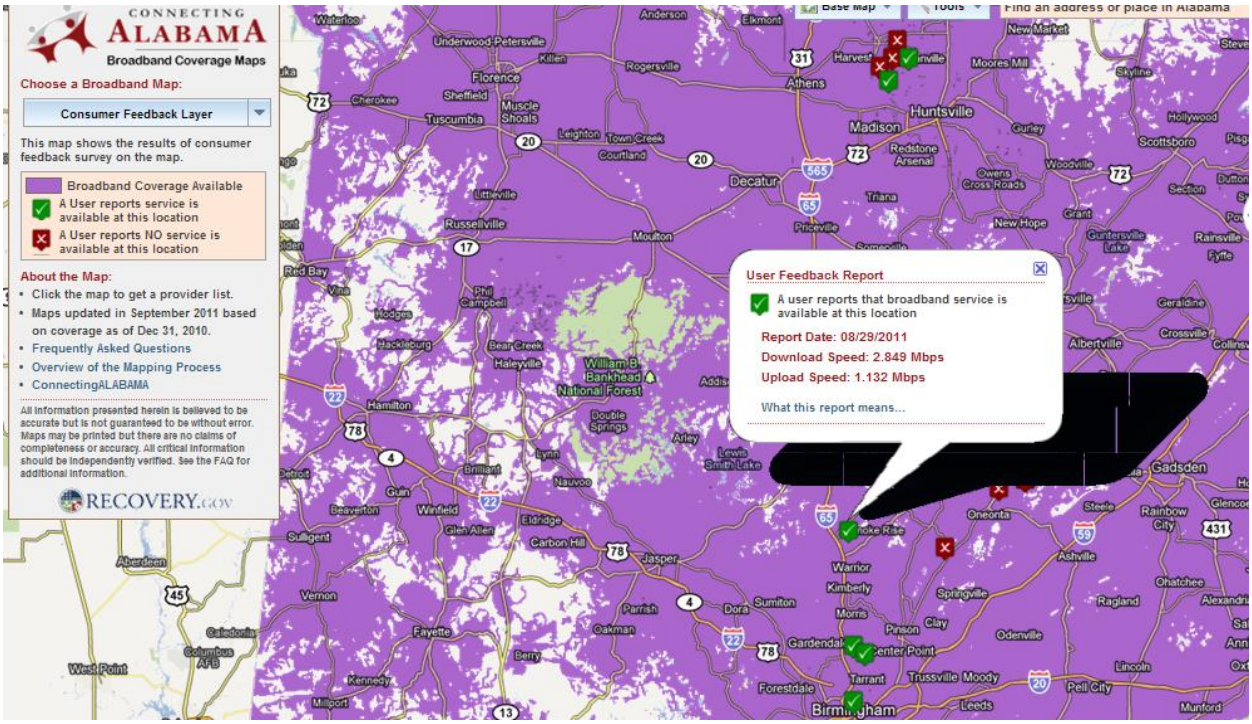
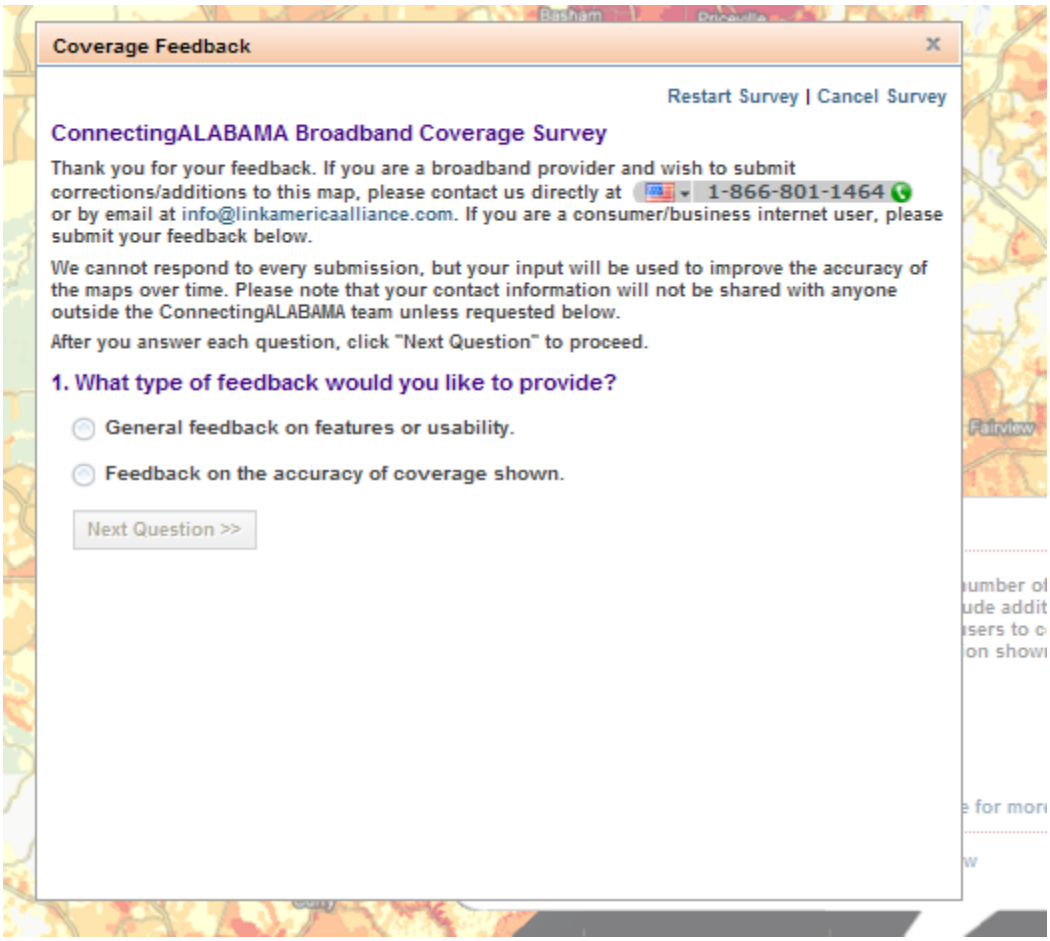


Figure 21--Consumer Feedback Layer

To gather feedback, we use a survey wizard which asks the end users to categorize their concerns. The survey went through several iterations of design and usability testing. Our experience has been unless we get a way to constrain the user feedback into manageable categories, it becomes very difficult to act upon.



As mentioned by other Grantees we struggle with how to use all of the feedback we receive. The qualified data points seem to fall below a volume in which we can infer significant modifications to the map data. Nevertheless, we believe it is important to gather structure and display the feedback to support project transparency.

Perception of Unfair Treatment Across Technologies

Several Broadband service providers have expressed strong concerns regarding how wireline services are displayed, as contrasted to how wireless coverage is displayed. This is an artifact of the SBI data model. As an example, consider the figure below.

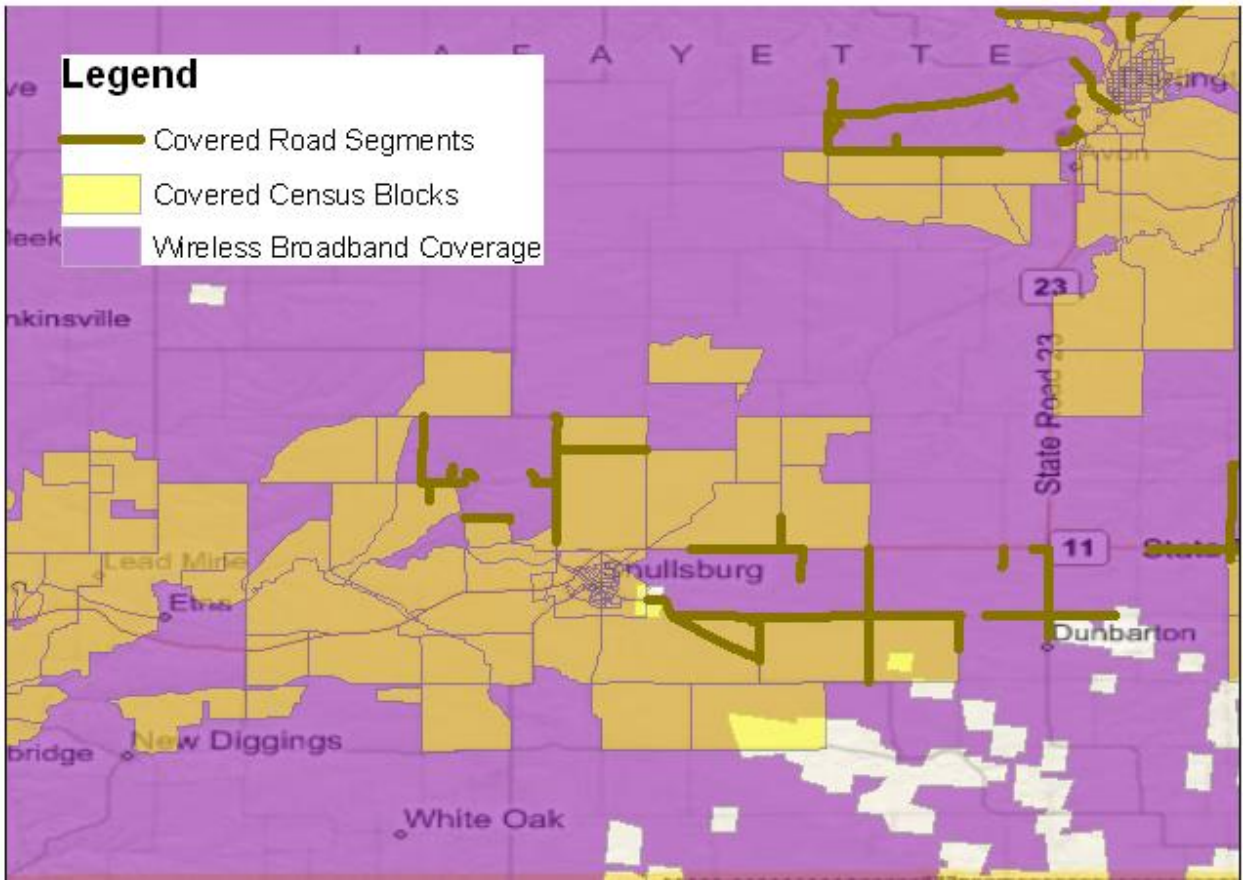


Figure 22--Multi Network Coverage portrayal

In this image, covered Census Blocks are light gold. Covered road segments are a darker gold and wireless coverage is purple. The concern seems to come down to how a wireline provider's coverage is shown in the large Census Blocks (greater than 2.0 sq mi). Some wireline providers have expressed dissatisfaction because their coverage is only tied to road geography, which leads to a visual "hole" in their coverage map. At the same time, they feel that it is unfair that the wireless provider's coverage is shown to be uniform in the same area. Put another way, if our maps show wireline in terms of Blocks and segments, why don't our maps show wireless the same way? This concern is getting amplified because wireless speed does not vary by block whereas wireline does.

Loss of Geographic Granularity

Some providers particularly those who submitted facility level information are disappointed when we have to roll the derived data up to Census blocks or road segments as this changes the appearance of their service areas. This is especially important in rural areas where the larger blocks represent more of the service territory. Further, the FCC Order requesting service level boundaries has made some providers unhappy when submitted block level information does not line up with their service areas.

Perceptions of Carrier of Last Resort (COLR) Obligations

Some wireline providers have also expressed dissatisfaction because online maps limit the distance of coverage from a road segment. In our current online maps we buffer a wireline carrier's service 300' from road centerline. A number of providers have expressed that they are mandated to provide voice coverage (which Broadband will accompany) anywhere in the Exchange. There seems to be many dimensions to this argument, but the basic concern comes down to not being able to accurately reflect the scope of their COLR obligation within the mixed block/segment view. Their ability (or lack thereof) to actually provision such services for new users within a 7-10 day period adds yet another level of complexity when attempting to fairly portray their coverage capabilities.

Intentions of Coverage Mapping

When a viewer of an online map clicks on the map (or zooms to an address), they are provided with a pop-up of service provider coverage in the area. The critical question is this: what is the area to which that pop-up window responds to? In the past, we reported back to the specific Census block, or buffered road segment intersected by the user click. As far as the map was concerned, once we move off of that road, or out of that segment, we have a new area to examine.

Our sense, given feedback received, is that our provider view should be a bit more tilted toward finding providers in a general area, rather than finding providers at a single-click location. If the goal of the map is to get someone to call a provider for service, our bias should be to include all of the potential providers in the general area, rather than giving potential customers a method to self-disqualify. That is, we want to cast a wider coverage net, rather than one too narrow. The problem with this approach is that it will create a number of false positive Broadband reports. As of this date we cannot determine if the claims of inaccurate coverage in online maps are due to the looser provider view standard or not. We keep this looser standard in place to minimize the likelihood of self-disqualifications.

Appendix One--Alabama

Community Anchor Institutions

LinkAMERICA began transitioning the Community Anchor Institution (CAI) data collection effort in the state of Alabama to ConnectingALABAMA in Round 3. For Round 4 ConnectingALABAMA assumed full responsibility for the CAI data collection effort in Alabama.

In the current submission ConnectingALABAMA worked to achieve two goals.
1-Obtain CAI connectivity data sets from sources in State
2-Compare these data sets with previous and make necessary changes and additions to previous submissions.

ConnectingALABAMA was able to obtain GIS feature classes for the following CAI's from Homeland Security Information Network (HSIN). These features include the following:

1-Alabama Private Schools
2-Alabama Nursing Homes
3-Alabama Urgent Care Facilities
4-Alabama Health

Basic information included in the data sets is contact anchor name and contact information including physical addresses and phone numbers. The datasets also contain qualitative information regarding the generation of latitude and longitude values for each CAI.

ConnectingALABAMA's primary focus for this submission was to use personal contacts and phone calls to get increased connectivity information.

The FULLFIPSID was populated using the GEOID10 ID from 2010 Census data. The focus of collection 7 will be the supplementation of missing data.

ConnectingALABAMA will utilize the following actions to locate connectivity data:
Alabama Broadband Advisory Board will be asked to participate in the identification of data. The board includes:

Alabama Commission on Higher Education
Alabama Department of Agriculture and Industries
Alabama Department of Children's Affairs
Alabama Department of Conservation and Natural Resources
Alabama Department of Economic and Community Affairs
Alabama Department of Education
Alabama Department of Homeland Security
Alabama Department of Postsecondary Education
Alabama Department of Public Health
Alabama Development Office
Alabama House of Representatives

Alabama Rural Development Office
Alabama Senate
Alabama Supercomputer Authority
State of Alabama, Information Services Division

ConnectingALABAMA Regional Coordinators will work within the regional Broadband Action Teams to identify connectivity or appropriate contacts

ConnectingALABAMA will work in cooperation with Alabama Supercomputer Authority and local schools to identify true connectivity. We have identified that while all schools are connected through our Alabama Supercomputer Authority, these schools are also purchasing additional connectivity.

ConnectingALABAMA has begun the process of implementing regional broadband plans. Many of these plans include projects that will identify connectivity as well as connectivity needs. The use of the local individual already committed to assisting with Broadband will provide an alternative to published data that could have changed since last assessment.

Appendix Two

Data Collection Challenges

This section summarizes some of the challenges we have experienced with data collection and processing. The team believes it is important to categorize these challenges as they help inform the geoprocessing and verification methods used. It is also our hope that some of the more global issues can be discussed and decided within the Grantee community.

We begin with several global issues and then continue toward more granular challenges.

Global Data Collection Issues

Maximum Advertised Speed is Not Reported Consistently

As has been discussed in webinars and also within the context of NTIA data assessments, much reported speed information continues to be reported at the market level (MSA/RSA) and then uniformly pushed down to the Census blocks. This has a tendency to create a problem with NTIA speed tripwires since the technology is reported by block but the maximum advertised speed is reported at a regional level.

This challenge gets further amplified at a block level when comparing to a third party data provider. It can create a mismatch between third party data generated at an area larger than block level versus block level generated speed and vice versa. To minimize the potential confusion, it might be helpful to be able to provide a flag at the submitted record level which indicates the geographic basis by which the Maximum Advertised Speed is reported.

Census Block and Road Standards are not clear

There seem to be several methods by which providers are calculating the Census block area. So the distinction at 2.00 square miles can be uniform, it would be ideal to articulate an operational area calculation definition.

Providers Not Wishing for Block Level Aggregation of Their Data

For providers who submit address point data, we do minimal additional processing. Our main test is to ensure that points are contained within 1 mile of exchange boundaries; the only other processing was normalization into NTIA formats.

Broadband providers not Meeting the NOFA "provider" Definition

Comments on PBWorks appear to reflect a concern among a number of grantees about what a Broadband provider is--and how that definition impacts mapping.

If the 7-10 day provisioning rule is to be strictly enforced, it could seem to eliminate a number of prominent Broadband providers[28]. Further, the need for clarification around a facilities-based provider,

[28] By email ***REDACT*** informed us they could not provision in 7-10 days, but they also supply information on qualified locations to the address point level. Therefore, we draw a distinction between an incumbent provider owning the facility--which terminates at a customer premise--who cannot turn up service at a qualified location,

versus the reseller, has injected even more uncertainty. Right now we are unclear on how strictly to interpret either of these important distinctions, but we are concerned that we are beginning to create an NTIA exclusion criterion that is going to confuse downstream consumers of the data.

Given mergers and acquisitions in the CLEC space we are noticing a drop off in participation in this program by several national CLECs. We hope this is an artifact of the mergers and resource constraints rather than a long term trend.

Again, we do not want to exclude a service provider, but we believe there needs to be further clarification around the "7-10 day rule," the definition of a "reseller," and better interpretation of facility-based providers, versus equipping UNEs, SpA or leased lines.

We have used the provider Type of "Other" to classify a number of providers who offer Broadband services, but we do not offer them in a manner consistent with Technical Appendix A definitions.

To What Extent Should We Begin "Classifying" the Data and Maps?

The question immediately preceding gets to the intent of a Broadband provider. This question gets to the intent of the Data and Maps.

Earlier in this document we discussed the question of what type of bias we should introduce to our online map messaging. In an online environment, do we want to more likely create an overstatement of coverage for a provider than an understatement? In other words, is the larger problem allowing a consumer to self-disqualify, versus calling a number of neighboring providers? There is a related issue to this. Clearly in our maps there is a lot of scatter in data that we believe should be more continuous. These are the islands of coverage from an incumbent provider[29]. There are a number of processes that could be put in place to deal with this type of scatter, but without more information from the service provider-- essentially the last mile facilities-- it will be difficult to perform this clean up in an informed manner. On the one hand, we can aesthetically clean the maps up and reduce the scatter, but we have little sub-block engineering information upon which to make this decision. Right now our preference is to put out a somewhat aesthetically messier deliverable and work with providers to get better information to clarify their submission. If that isn't forthcoming, we are limited in what can be done given the lack of facility level information. In summary this yields two questions

In our online maps should we error on overstating coverage to prevent consumer self-disqualification?
In our online maps should we work to clean up a lot of the scatter that we see without having facility-based evidence from which to remove it?

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versus a provider not reporting any specific qualified locations in which they cannot turnup service in the 7-10 day window. In the first case we have a sense of where service can be offered and verified. In the second, we have no evidence that a service could exist there until a specific location becomes a customer.

[29] For a provider who sells opportunistically (not within a franchise area) it becomes even more problematic to classify their coverage because the points are more related to the type of consumer purchasing the service than a bounded offering. In a matter of speaking, the ProviderType is more determined by the technology and/or location than a type of business. The core intent of the NOFA and our grant application was centered around the 7-10 day providers but we believe maintaining information on provider Type "Other" and "Reseller" is important to assist in validation and market segment analysis as resources are available.

As we examine results from third party data assessments, it appears that this scatter is something that is also problematic with the assessment results. It also appears to be evident that different third party data sources treat water areas differently. When we are developing data based upon Wireline facilities, we exclude water blocks. We do not filter out water blocks from provider submitted data. We are unsure if there is or should be a standard in how water covered blocks are treated for Wireline broadband providers.

Community Anchor Institution Surveys

Over time the base of participation in CAI surveys has broadened. Our teams are interacting with more organizations interested in broadband planning. This is a benefit because it helps integrate the importance of Broadband mapping, planning and capacity building within their organizational framework. But it also begins to create challenges in data collection. There are two noticeable trends in this area.

First, CAIs are organizationally diverse. For a school, you expect to have a centralized entity that can answer and support questions about Broadband services. For a rural, volunteer fire department answering questions about broadband may go to the Chief. The way that he/she answers about Broadband is probably specific to her experience and context. The implication is two-fold. First saying that some percentage of CAIs in a state have access to broadband can be misleading because the formality of a school or government building is much different than the formality of a volunteer fire department. Second, that volunteer fire department may get broadband via a 3G mobile hotpsot when they need it…but the presence of *this* type of broadband is a very different thing than the presence of a responder who has mobile LTE broadband.

Second, technical knowledge of the survey respondent differs within each organization. This complicates our data collection. It is not uncommon for someone to say yes we have Broadband, I just don't know how we get it or how fast this is. So in response we report they are broadband served but unknown speed or technology. This doesn't mean they haven't been surveyed, it just means the response was unknown. As there are now a large number of people collecting this data, it would be helpful to have some consistent national business rules from which we can answer questions about the meaning of any particular data element. As an example, when should "no" be used versus when should "unknown "be used. In other words, what is the standard for the difference between never made contact with the CAI versus a respondent didn't know/couldn't answer. We have guidelines internally but are unsure if this is consistent across states.

Granular Data Collection Issues

Non-Uniform Submission Standards

It is clear among providers that there isn't a consistent method used to derive Broadband coverage. Some providers appear to be use a geocoding approach and then point in polygon or point on segment process. Others may be using GPS locations. In some cases, it is difficult to infer what reference data was used to georeference plant (is it the carrier's roadbase?). This leads to uncertainty regarding the input data scale or accuracy relative to other base layers. Although we may be trading off absolute

accuracy, our standard has been to conflate submitted data to TIGER 2010 Blocks and TIGER 2010 roads. We perform our verification against this conflated data product.

Temporal

We are unsure of how well the data are temporally consistent. Some providers gave us their best effort to control to the requested survey date. We note that some providers were clear that the submission was as of extract date without any way to move back in time. They have no means to control for time and cannot provide any audit support beyond when the data are released to us. Some data-especially loop qualification data-may change from day to day. It will be very difficult to clarify why something was changed from a given point in time.

Perceived Inaccuracy with Respect to Internal Standards

The NOFA is clear on submitting a list of Blocks in which a provider delivers Broadband service. This is a different objective than perfectly reflecting service territories. If a firm's accuracy standard is a reflection of their service area, then the data created under the NOFA will not meet their perception of accuracy. This leads to two other issues: First, using Census Blocks rather than serving area may overstate or understate a particular provider's Broadband serving area. This was a significant concern of ***REDACT*** who specifically required us to submit only address-level qualification data. The second issue this brings up is how or if, there should be some standard on how much of a Census Block needs to be covered to call it covered.

Confidentiality

Several providers have noted concerns with CPNI-related issues and have stated this as a reason for non-participation. We have also heard expressions of comparable concern regarding identifiable responses to Anchor Institution information.

Unclear on Definitions

As discussed earlier, several providers claimed confusion on several key terms involved in Middle Mile. We note a consistent stream of questions around the interpretation of Maximum Advertised Speed. Some providers understand this to be the most common speed package bought within the mass market, while others view this as a speed that can be purchased for an additional cost above a mass market offering (e.g. a Turbo option for an additional fee per month). Others interpret this as the fastest speed that is available for that particular location--in terms of xDSL, a structure qualified speed, for example.

Perception of Data Use

There seems to be some hesitancy releasing speed information because no one is sure of how the information will be used, or what the speed is intended to reflect. A number of providers have verbally indicated that typical speed will be about (on average) 80% of purchased speed due to overhead. But there are many other factors (such as a user's home network) that influence speeds measures. Providers are concerned about introducing statistics without a clear understanding of how those statistics are derived and will then be used. Also, as advertised speed is pushed down to a block level, we sense more trepidation to report speed values. This quickly begins to touch on parity across network types (why is wireline down at the block when wireless is half the state, etc.). Finally we note a

significant increase in speed values reported to us. This may be due to network upgrades or competitive concerns to match the theoretical network speed.

Location Uncertainty In Source Data

Within this document we have noted concerns about the impact of source data accuracy. Our geoprocessing methodology provided what we believe is a relatively conservative tolerance to account for the scale issue in the source data, but we are unsure of how this may impact downstream users. Clearly, it also impacts the verification process because we can't attempt to verify received data beyond a scale at which it was developed.

Covered Segment Process

Deriving Broadband covered segments in Census Blocks greater than 2 square miles has proved to be a challenge. Moving from a NOFA specified tabular deliverable to a requested geographic deliverable also increases the complexity of the effort.

Record Level Metadata

It would be helpful to have one or two additional fields in each feature class transmitted to NTIA. One User Defined field could be helpful as an expression of record level confidence. The second field could be used as a Key between the transfer geodatabase and our systems. Ideally, both fields could be large text fields (50 char) so the Grantee can use them to express a variety of attributes.

Miscellaneous Data Collection Notes

We note the following important observations regarding our data submission:

There are Middle Mile plant records for providers who are not present in the Census block, segment or wireless area feature classes. This is due to classification as non-NOFA Broadband providers.
In some cases, we have trimmed wireless coverage estimates to honor state boundaries.
We believe some providers are trimming their coverage to honor license area boundaries.
Where a provider submitted Middle Mile points out of state, we are no longer passing those points to NTIA as they fail the validation script.
In tables with mandatory Street and Zip5 attributes (Service Address), if the value is unavailable we fill the default value.
As before there remain some differences between the Data Model, Data Model Default Values and the Python Validation Script.
We have a significant amount of VDSL, ADSL 2 and ADSL 2+ coverage categorized into the xADSL category. This introduces large variance in speed availability as some providers are using VDSL, shortened loops and/or pair bonding to increase speed to levels nearly 30 Mbps.
We note a few providers who have speeds seemingly inconsistent with their technology of transmission. This is either very low speeds with optical fiber, or very high speeds with non DOCSIS 3.0 systems. We have verified on provider websites that the reported speeds are available in the area but these speeds will fall out of the NTIA frequency table analysis.
We have a small number of providers who serve an area with both a residential and business speed tier. In cases where we cannot distinguish which speed tier offering to use, we use the higher of the speed tiers.

Per NTIA request we have modified the manner in which we handle Wireless coverage polygons. If a Provider submits a single geometry but specifies multiple spectrum codes in use in that polygon, we duplicate the polygon for each spectrum code. In other words the geographic object is identical but the attribute data for the object is unique.

In point level data submissions (Service Address and CAI) we note points that are spatially coincident. With respect to Service Address points our thought is these represent multi-unit dwellings or businesses but we don't have enough address detail to determine if these are multi-unit structures or duplicated customers. Because we cannot determine the reason for the duplication we leave spatially coincident records in our submission. We also leave in our CAI submission points which may be the same physical structure but have slight variations in addressing.

In point level middle mile data, we are finding a variance in the quality of the geocoded longitude and latitude returned. Given the data received we are unsure if this is an issue where the plant address is difficult to geocode or if the longitude and latitude provided to us is different than what would be returned in geocoding.

For Block and Segment level data which we produce based upon provider facility or service area boundaries, we remove Census blocks which are entirely water covered. This results in a drop of Census block counts for a number of providers.

Appendix Three

This appendix contains the confidentiality clarification supplied in a series of emails between CostQuest and NTIA.

Feature Class	*Metadata*	*NOFA Confidential?*	*Online Map*	*Public Disclosure*	*Exemption*
Last Mile	Constraints on accessing and using the data	Yes	No	No	None
	Access constraints: None				
	Use constraints:				
	This data is confidential as defined in the NOFA.				
Middle Mile	Constraints on accessing and using the data	Yes	No	No	None
	Access constraints: None				
	Use constraints:				
	This data is confidential as defined in the NOFA.				
Service Address	Constraints on accessing and using the data	No	No	Yes	
	Access constraints: None				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
CAI	Constraints on accessing and using the data	No	Yes	Yes	NO attributes on any record in this feature class are considered confidential

	Access constraints: None				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
Census Block	Constraints on accessing and using the data	No	Yes	Yes	NO attributes on any record in this feature class are considered confidential
	Access constraints: None				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
Service Overview	Constraints on accessing and using the data	No	Yes	Yes	The only provider who may not show up on this table is a provider who has provided only confidential data (last mile, Middle Mile,

					address point with provider name)
	Access constraints: None				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
Road Segment	Constraints on accessing and using the data	No	Yes	Yes	NO attributes on any record in this feature class are considered confidential
	Access constraints: None.				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
Wireless	Constraints on accessing and using the data	No	Yes	Yes	NO attributes on any record in this feature class are considered confidential
	Access constraints: None				
	Use constraints:				

	There are no restrictions on distribution of the data by users

Appendix Four-Alabama

This appendix details our analysis of the potential and actual broadband provider market. We include both our internal tracking description document and then our categorization for each provider. As this extract was made prior to final submission, there may be differences between provider categorization and the attributes on the day of submission to NTIA.

Provider Categorization

Provider Type and Status Definitions

The Provider Type is based upon categories provided by NTIA, while the Provider Status is based upon categories developed internally for tracking purposes. It should be noted that the Provider Status discussed here relates to the provider's overall status within the program.

Provider Type Codes and Definitions:

NTIA code	Code	Name	Definition
1	P	Provider	This code applies to all confirmed providers of broadband service per the SBI program NOFA. A provider is given a "P" designation if we have determined that the company does indeed exist and appears to be providing broadband services.
2	R	Reseller	This code applies to all broadband entities that have been confirmed as pure resellers – meaning they do not own their own facility/equipment and simply resell services under their own brand name or the brand name of an actual Provider.
3	O	Other	The code applies to entities who were originally placed on the SBI provider list, but whose status is still in question or has been determined to be non-NOFA compliant.
	N/A	Not applicable	This code applies to entities who appeared on the original state provider list or a third party list (such as the FCC 477, American

4			Roamer, or Warren Media lists) but who have been confirmed as NOT providing broadband services.
	X	Inactive	This code applies to entities that may have appeared on an early provider list but whose identity and existence we subsequently have been unable to verify. This code may also apply to providers who have since been acquired or simple gone out of business and for which no FRN appears on the FCC list – These no longer need to be reported to NTIA. This is an INTERNAL category used to remove entities completely from the list of entities submitted to NTIA.

Once the proper Provider Type has been assigned to an entity, an overall Provider Status must be established. The Provider Status codes are specific to the Provider Types, and are not interchangeable. The following table lists the status codes associated with each Provider Type.

Provider Status Definitions

Provider Type Code	Provider Status Code	Name	Definition
P	D	Declined	A provider is given a Status of "D" if they have officially stated verbally or in writing that they will not participate in the SBI program.
	P	Participating	A provider is considered to be "Participating" if they have submitted USABLE data in at least one data submission round. The data does not need to be 100% complete for a provider to be assigned a "P" code – they simply have to have provided a level of data that is sufficient to submit to NTIA.
	NR	Non Responsive	A provider is considered "Non Responsive" if they have either failed to respond to any of our correspondence, or they have submitted insufficient data that makes inclusion of their data in the NTIA submission impossible.
	V	Submitted under other ID	A provider whose data is submitted under another Provider ID, but is operating under their own FRN.
	E	Estimated	A provider is marked as "Estimated" if they have not submitted usable data, and would otherwise be considered non-responsive, BUT for whom we are able to submit data by using estimation techniques and/or third party sources. This designation applies only to providers whose data is 100% estimated.
R	R	Reseller	"R" is the only status code for Resellers and it simply reconfirms their status as a reseller –data may not be submitted but name of provider is included in NTIA data package.
O	U	Unknown	The status of Unknown is assigned to an entity whose name has appeared on a list (or been submitted as a new possible provider) and is currently under investigation. It has not been determined yet if this entity is indeed offering broadband services or not.
	NC	Non-Compliant	This status is assigned to entities who appear to be in the broadband industry, but who do not meet the formal definition of a BB provider under NOFA requirements. Examples may be entities who cannot provision service within 7-10 days.

	P	Participating	These are providers who do not meet the formal definition of a BB provider under NOFA requirements, but are participating in the program and submitting data.
	NP	Not a Provider	This status applies to entities who may appear on a third partly list of valid providers, but who have been proven to either no longer exist, or simply no longer provides broadband services.
N/A			No status codes associated with this Provider Type
X			

Provider Disposition

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
1	AL	Ardmore Telephone Company	Ardmore Telephone Company	Synergy Technology Partners, Inc.	P	P
2	AL	AT&T Inc.	AT&T Mobility Services, Inc.		P	V
4	AL	Otelco Inc.- AL	Brindlee Mountain Telephone Company duplicate		X	
5	AL	CenturyTel, Inc.	CenturyLink	CenturyTel, Inc.	P	P
6	AL	Farmers Telecommunications Cooperative, Inc	Farmers Telecommunications Cooperative, Inc	Farmers Telephone Cooperative, Inc.	P	P
7	AL	Frontier Communications of Alabama, LLC	Frontier Communications of Alabama, LLC	Frontier Communications Corporation	P	P
8	AL	GTC, Inc.	FairPoint Communications	FairPoint Communications, Inc.	P	P
9	AL	Gulf Tele	CenturyLink		P	V
10	AL	Harbor Communications	Harbor Communications, LLC	Harbor Communications	P	NR
11	AL	Hayneville Telephone Company	Hayneville Telephone Company	Hayneville Holding Company, Inc.	P	P
12	AL	HiWAAY Internet Services	HiWAAY Internet Services		N/A	NP
15	AL	Knology Total Communications, Inc.	Knology	Knology, Inc.	P	D
16	AL	Millry Telephone Company, Inc.	Millry Communications	Millry Corporation	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
17	AL	MonCre Telephone Cooperative Inc.	MonCre Telephone Cooperative Inc.	Mon-Cre Telephone Cooperative, Inc.	P	P
18	AL	Moundville Telephone Company	Moundville Telephone Company	Moundville Communications, Inc.	P	P
19	AL	Telephone Electronics Corporation	National Telephone of Alabama, Inc.		P	V
20	AL	New Hope Telephone Cooperative	New Hope Telephone Cooperative	New Hope Telephone Cooperative, Inc. (AL)	P	P
21	AL	Otelco, Inc.	Otelco Telephone LLC	Otelco Inc.	P	P
22	AL	Pine Belt Telephone Company, Inc.	Pine Belt Telephone Company, Inc.	Pine Belt Communications Co. Inc.	P	P
23	AL	Ragland Telephone Company	Ragland Telephone Company	Ragland Telephone Company, Inc.	P	E
24	AL	Roanoke Telephone Company	TEC/Roanoke Division	N/A	P	P
27	AL	Union Springs Telephone Company	Union Springs Telephone Company	Ropir Industries, Inc.	P	P
29	AL	Windstream Alabama, LLC.	Windstream	Windstream Corporation	P	P
31	AL	ITC^DeltaCom, Inc.	Business Telecom	ITC^DeltaCom, Inc.	O	NC
33	AL	Alabama Broadband, LLC	Alabama Broadband, LLC	Alabama Broadband	P	P
35	AL	Bright House Networks	Bright House Networks	Bright House Networks, LLC	P	P
36	AL	Cable ONE	Cable ONE	Cable One, Inc.	P	P
37	AL	Ragland Telephone Company	Cable Star		P	D
38	AL	R.M. Greene Inc.	Cable TV of East Alabama	R. M. Greene, Inc.	P	P
40	AL	Charter Communications	Charter Communications	Charter Communications	P	P
41	AL	Comcast of Alabama, Inc.	Comcast	Comcast Corporation	P	P
42	AL	Coosa Cable Company Inc.	Coosa Cable Company Inc.	Coosa Cable Company/Cable Vision Services	P	P
43	AL	CommuniComm Services	James Cable	CommuniComm Services	N/A	NP
44	AL	Demopolis CATV	Demopolis CATV	Demopolis CATV Co.	P	P
45	AL	Edge's Cable Co., LLC	Edge's Cable Co., LLC		N/A	NP
46	AL	Knology of Alabama	Knology	Knology, Inc.	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
47	AL	Lee Co Alabama (same Co. as Al_Co) - R. M. GREENE INC.	Cable TV of East Alabama		P	V
48	AL	Mediacom Southeast, LLC	Mediacom	Mediacom Communications Corp.	P	P
50	AL	Northland Cable Television	Northland Cable Television	Northland Communications Corp.	P	P
51	AL	Opp Cablevision	Opp Cablevision	Opp Cablevision	P	P
52	AL	Otelco, Inc.	Hopper Telecommunications Co.	Otelco Inc.	P	P
53	AL	Riviera Utilities Cable	Riviera Utilities Cable	Riviera Utilities Cable TV	N/A	NP
54	AL	Scottsboro Electric Power Board	Scottsboro Electric Power Board	Scottsboro Electric Power Board	P	P
55	AL	Sky Cablevision	Sky Cablevision	Sky Cablevision	P	NR
56	AL	Time Warner Cable LLC	Time Warner Cable	Time Warner Cable Inc.	P	P
57	AL	Troy Cablevision, Inc.	Troy Cablevision, Inc.	Troy Cable	P	P
58	AL	TV Cable Of Andalusia, Inc.	TV Cable Of Andalusia, Inc.	TV Cable Company of Andalusia, Inc.	P	P
59	AL	West Alabama TV Cable Co., Inc	West Alabama TV Cable Co., Inc	West Alabama TV Cable Company Inc.	P	P
60	AL	Cobridge	Windjammer Communications LLC	Windjammer Communications LLC	N/A	NP
61	AL	BellSouth Telecommunications, Inc.	AT&T Alabama	AT&T Inc.	P	P
62	AL	Verizon Wireless	Verizon Wireless	Verizon Communications Inc.	P	P
63	AL	T-Mobile USA, Inc.	T-Mobile	Deutsche Telekom AG	P	P
65	AL	Corr Wireless Communications	Corr Wireless Communications	Corr Wireless Communications	N/A	NP
68	AL	Advanced Computer Solutions, LLC	Advanced Broadband	N/A	P	P
69	AL	CyberBroadband	Advanced Broadband		P	P
70	AL	Aerowire, Inc.	Aerowire, Inc.	Aerowire, Inc.	P	NR
71	AL	Alanu Internet Solutions	Alanu Internet Solutions		N/A	NP
73	AL	Advanced Broadband (Capshaw)	Advanced Broadband		P	V
74	AL	Boondocks Wireless	Boondocks Wireless		P	NR
75	AL	BoaGroup, LLC	Boonlink	N/A	N/A	NP
76	AL	C & G Computers	CnGWireless	N/A	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
77	AL	CTSWireless.NET	CTSWireless.NET		P	NR
78	AL	Cyber Broadband	CyberBroadband	N/A	P	P
79	AL	Dixie Land Internet Services	Dixie Land Internet Services		P	NR
80	AL	Gosuto Wireless	Gosuto Wireless	N/A	P	P
82	AL	HorizonWisp.net	HorizonWisp.net		P	NR
84	AL	The Contact Network, Inc.	InLine	The Contact Network, Inc.	N/A	NP
85	AL	Internet Technology Consultants	Internet Technology Consultants		X	
86	AL	JMF Solutions, Inc	JMF Solutions, Inc		P	NR
88	AL	professional2-wayradio.com/NetSpeedNow.com	NetSpeedNow.com		P	NR
89	AL	Network Solutions	Network Solutions		P	NR
90	AL	Novo Communications	Novo Communications		N/A	NP
91	AL	Omni Broadband	Omni Broadband		N/A	NP
92	AL	Shelby Telecom	Shelby Telecom		P	NR
93	AL	Southnet	SouthNet; A Tombigbee Electric Company	N/A	P	P
94	AL	Starlite Computers	Starlite Computers	Starlite Consulting Inc.	P	P
96	AL	Traveller Multimedia Network	Traveller Multimedia Network		P	NR
97	AL	TriDigital Broadband	InLine	The Contact Network, Inc.	X	
98	AL	Trillion Digital Communications	Trillion Digital Communications		X	
99	AL	US Wireless ONline	US Wireless Online		N/A	NP
101	AL	VeriQik	VeriQik		P	NR
102	AL	VisionSix Internet	VisionSix Internet		X	
103	AL	WP Media	WP Media		P	NR
112	AL	International Broadband Electric Communications, Inc.	CybrTyme	IBEC, Inc.	N/A	NP
113	AL	AL Supercomputer	AL Supercomputer		O	NC
200	AL	Alliance Communication Network	Alliance Cable	Alliance Communications	N/A	NP
333	AL	MOMENTUM TELECOM INC	MOMENTUM TELECOM INC		R	R
639	AL	DIECA Communications,	Covad	Covad Communications	N/A	NP

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
		Inc.	Communications Company	Group, Inc.		
640	AL	Cherokee Telephone Company	TEC/Cherokee Division	Telephone Electronics Corporation	P	P
643	AL	DSLnet Communications, LLC	DSLnet Communications, LLC	Megapath, Inc.	N/A	NP
644	AL	Megapath, Inc.	Megapath	Megapath, Inc.	N/A	NP
658	AL	Level 3 Communications, LLC	Level 3 Communications, LLC	Level 3 Communications, LLC	P	P
665	AL	ViaSat, Inc.	ViaSat Communications	WildBlue Communications, Inc.	P	P
673	AL	New Edge Network, Inc	New Edge Network, Inc.	New Edge Holding Company	O	NC
677	AL	Utilities Board City of Sylacauga	Utilities Board City of Sylacauga	The Utilities Board of the City of Sylacauga	P	P
684	AL	Southern Light	Southern Light	Southern Light, LLC	O	NC
689	AL	NuVox, Inc.	NuVox, Inc.		O	NC
692	AL	Butler Telephone Company, Inc.	TDS	Telephone and Data Systems, Inc.	P	P
693	AL	Oakman Telephone Company, Inc.	TDS	Telephone and Data Systems, Inc.	P	P
694	AL	Peoples Telephone Company, Inc.	TDS	Telephone and Data Systems, Inc.	P	P
698	AL	Com-Link, Inc.	Com-Link, Inc.	Ropir Industries, Inc.	P	P
699	AL	Knology of Huntsville	Knology	Knology, Inc.	P	D
700	AL	Knology of Montgomery	Knology	Knology, Inc.	P	D
701	AL	Knology of the Valley	Knology	Knology, Inc.	P	D
702	AL	Valley Telephone	Knology	Knology, Inc.	P	P
703	AL	Knology of the Wiregrass	Knology	Knology, Inc.	P	D
706	AL	Otelco, Inc.	Brindlee Mountain Telephone	Otelco Inc.	P	P
707	AL	Otelco, Inc.	Blountsville Telephone	Otelco Inc.	P	P
708	AL	AT&T Corp., Inc.	AT&T Corp.		P	P
709	AL	AT&T Mobility LLC	AT&T Mobility LLC	AT&T Mobility	P	P
711	AL	Clearview Cable	Clearview Cable		N/A	NP
714	AL	Sprint Nextel Corporation	Sprint	Sprint Nextel Corporation	P	P
717	AL	Galaxy Cable Inc.	Galaxy Cable Inc.		N/A	NP
718	AL	MetroCast Communications of Mississippi, LLC	MetroCast Communications	Harron Communications LP	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
724	AL	Pine Belt Cellular, Inc.	Pine Belt Wireless	Pine Belt Communications Co. Inc.	P	P
725	AL	Camellia Communications	Camellia Communications	Hayneville Holding Company, Inc.	P	P
726	AL	Castleberry Telephone Company, Inc.	Castleberry Telephone Company, Inc.	Castleberry Communications	P	D
733	AL	Frontier Communications of the South, LLC	Frontier Communications of the South, LLC	Frontier Communications Corporation	P	P
734	AL	Frontier Communications of Lamar County, LLC	Frontier Communications of Lamar County, LLC	Frontier Communications Corporation	P	P
736	AL	Blount Wireless	Blount Wireless	N/A	P	P
753	AL	AL-GA Wireless	AL-GA Wireless Broadband LLC	AL-GA Wireless Broadband, LLC	P	P
756	AL	Clearview Tower Company, LLC.	Clearview Tower Company, LLC.		N/A	NP
757	AL	Farmers Telecommunications Corporation	Farmers Telecommunications Corporation	Farmers Telephone Cooperative, Inc.	P	P
760	AL	Leap Wireless International, Inc.	Cricket Communications, Inc.	Leap Wireless International, Inc.	P	P
761	AL	tw telecom of alabama llc	tw telecom	tw telecom inc.	P	P
772	AL	Multi-Path Networks, Inc.	Multi-Path Networks, Inc.	Multi-Path Networks Inc	P	P
784	AL	Baldwin County International/DSSI Services, LLC	Baldwin County International/DSSI Services, LLC	Baldwin County Internet / DSSI Services, LLC	R	R
786	AL	Birch Communications Inc	Birch Communications, Inc.	Birch Communications Inc.	R	R
787	AL	Broadstar, LLC	Broadstar, LLC	Broadstar, LLC	O	NC
788	AL	Broadview Networks Holdings, Inc.	Broadview Networks Holdings, Inc.	Broadview Networks Holdings, Inc.	P	D
789	AL	Florida Consolidated	Florida Multi-Media Services, INc	Florida Consolidated Multi-Media Services, Inc.	R	R
791	AL	HNS License Sub, LLC	Hughes Network Systems	Hughes Communications, Inc.	P	P
793	AL	Mobile Internet Services	Mobile Internet Services	Mobile Internet Services	P	NR
794	AL	'Talk America Inc.	Cavalier Telephone		N/A	NP

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
796	AL	SmartResort Co. LLC	Beyond Communications	SmartResort Co. LLC	P	NR
797	AL	StarBand Communications Inc.	StarBand Communications Inc.	StarBand Communications Inc.	P	P
798	AL	Stratos Global Corporation	Stratos Offshore Services Company	Stratos Global Corporation	O	S
799	AL	Telovations, Inc.	Telovations, Inc.	Telovations, Inc.	N/A	NP
800	AL	Windjammer Communications LLC	Windjammer Communications LLC	Windjammer Communications LLC	N/A	NP
801	AL	Zayo Group, LLC	Zayo Bandwidth, LLC	Zayo Group, LLC	O	NC
831	AL	Knetworx, LLC	Smith Lake Broadband	N/A	P	P
833	AL	Farmers Cellular Telephone	FTC Wireless Internet	Farmers Cellular Telephone	P	P
837	AL	Skycasters, LLC	Skycasters, LLC		P	P
849	AL	Telapex, Inc	Cellular South	Cellular South, Inc	P	NR
850	AL	Access Spectrum	Access Spectrum	Access Spectrum	N/A	NP
854	AL	Allied Wireless	Allied Wireless	Allied Wireless	O	U
856	AL	Barat Wireless (USCC)	Barat Wireless (USCC)	Barat Wireless (USCC)	N/A	NP
861	AL	Cavalier Wireless LLC	Cavalier Wireless LLC	Cavalier Wireless LLC	N/A	NP
865	AL	Centurytel Wireless Inc	Centurytel Wireless Inc	Centurytel Wireless Inc	N/A	NP
867	AL	Cincinnati Bell Inc.	Cincinnati Bell Inc.	Cincinnati Bell Inc.	N/A	NP
869	AL	Cobridge Communication	Cobridge Communication	Cobridge Communications	N/A	NP
870	AL	Collinsville TV Cable	Collinsville TV Cable	Collinsville TV Cable	N/A	NP
879	AL	Eaglenet, Inc.	Eaglenet, Inc.	Eaglenet, Inc.	N/A	NP
880	AL	Envision Media Inc.	Envision Media Inc.	Envision Media Inc.	N/A	NP
905	AL	Public Service Wireless	Public Service Wireless	Public Service Wireless	O	U
906	AL	Qualcomm	Qualcomm	Qualcomm	N/A	NP
911	AL	Qwest Communications Company, LLC	CenturyLink	Qwest Communications International, Inc.	N/A	NP
912	AL	RAMCO BROADBAND SERVICES	RAMCO BROADBAND SERVICES	Ramco Broadband Services	N/A	NP
914	AL	Southern Company	Southern Company	Southern Company	O	NC
915	AL	SpectrumCo	SpectrumCo	SpectrumCo	N/A	NP
921	AL	The Contact Network, Inc.	PAETEC Business Services	PaeTec Corporation	N/A	NP

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
936	AL	Zoom Media	Zoom Media	Zoom Media	N/A	NP
939	AL	Telepak Networks	Telepak Networks		O	NC
940	AL	Wisouth Networks	Wisouth Networks		P	P
946	AL	BlountBroadband LLC	BlountBroadband LLC		P	P
947	AL	Alabama Highspeed	Alabama Highspeed		P	P
948	AL	MegaPath Corporation	MegaPath Corporation		O	P
100001	AL	AlaWeb Internet Services	AlaWeb Internet Services		R	R
100004	AL	Birch Communications Inc	Birch Telecom of the South, Inc.		X	
100005	AL	Blakely Cable TV Inc.	Blakely Cable TV Inc.		N/A	NP
100008	AL	BullsEye Telecom, Inc.	BullsEye Telecom, Inc.		R	R
100009	AL	Cable Options, Inc.	Cable Options		N/A	NP
100011	AL	Cogent Communications Group	Cogent Communications Group		O	NC
100015	AL	Global Crossing North America, Inc.	GLOBAL CROSSING TELECOMMUNICATIONS, INC.	Global Crossing North America, Inc.	R	R
100016	AL	GORDON CABLE TV	GORDON CABLE TV		N/A	NP
100017	AL	Gunby Communications	Gunby Communications		N/A	NP
100018	AL	Hickory Tech Corporation	Enventis Telecom Inc.		N/A	NP
100019	AL	Mayfield Communications LLC	RANBURNE CABLE		N/A	NP
100020	AL	Media3	Media3		P	NR
100021	AL	Metropolitan Telecommunications Holding Company	Metropolitan Telecommunications Holding Company		R	R
100023	AL	Open Range	Open Range		X	
100024	AL	pcAirLink Wireless	pcAirLink Wireless		P	NR
100026	AL	R. M. Greene, Inc.	R.M.Greene,Inc.		P	V
100027	AL	Rabbit Internet Services LLC	Rabbit Internet Services LLC		N/A	NP
100029	AL	RAPID COMMUNICATIONS LLC	RAPID CABLE		X	
100030	AL	S and V Wireless	S and V Wireless		P	NR
100033	AL	South Al Communications	Conexus		P	NR

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
			Communications			
100038	AL	Utopian Wireless Corporation	Utopian Wireless Corporation		P	NR
100039	AL	Verizon Communications Inc.	Verizon Business	Verizon Communications Inc.	O	NC
100043	AL	Broadcore, Inc.	Broadcore, Inc.		N/A	NP
100044	AL	A&E Design/IP-Networks	A&E Design/IP-Networks		X	
100046	AL	LightEdge Solutions, Inc.	LightEdge Solutions, Inc.		N/A	NP
100048	AL	Level 3 CommuNications, LLC - AL	WilTel Communications		P	V
100049	AL	Silver Star	Silver Star		N/A	NP
100051	AL	American IP	American IP		O	NC
100053	AL	DSL by Air	DSL by Air		P	NR
100054	AL	CenturyTel, Inc.	CenturyTel Acquisition LLC		P	V
100055	AL	Coosa Cable Co., Inc.	Coosa Cable Co., Inc.		P	V
100056	AL	Level 3 Communications, LLC - AL	Level 3 Communications		P	V
100057	AL	Airespring, Inc.	Airespring, Inc.		R	R
100058	AL	InterGlobe Communications	Interglobe Comm	Interglobe Communications, Inc.	N/A	NP
100060	AL	Residential Data Solutions	RDASOL		P	NR
100063	AL	Zito Media	Zito Media	Zito Media	P	NR
100077	AL	Dish Network	Dish Network	Dish Network	R	R
100079	AL	Almega Cable	Almega Cable		N/A	NP
100080	AL	City of Opelika Power Services	City of Opelika Power Services		O	NC
100082	AL	Southstar Satellite	Southstar Satellite		R	R
100088	AL	Auburn University Campus Cable System	Auburn University Campus Cable System	AUBURN UNIVERSITY CAMPUS CABLE SYSTEM	N/A	NP
100091	AL	Mediastream	Mediastream	MEDIASTREAM	N/A	NP
100094	AL	Airband Communications Holdings, Inc.	Airband Communications Holdings, Inc.	Airband Communications Holdings, Inc.	N/A	NP
100095	AL	EarthLink	EarthLink	EarthLink	O	NC
100096	AL	Light Tower Holding LLC	Light Tower Holding LLC	Light Tower Holding LLC	N/A	NP

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
100097	AL	Reallinx, Inc.	Reallinx, Inc.	Reallinx, Inc.	R	R
100098	AL	WOW! INTERNET, CABLE & PHONE	WOW! INTERNET, CABLE & PHONE	WOW! INTERNET, CABLE & PHONE	P	D

Technical Whitepaper
Arkansas Broadband Data Submitted for April 1, 2013 to NTIA

Submitted By Connect Arkansas

Connect Arkansas

Connect Arkansas, a private, non-profit, is implementing a community-based initiative to promote internet access and education. The Connect Arkansas Broadband Act was signed into law by Governor Beebe on March 28, 2007, to ensure the creation of a competitive broadband, or high speed internet, infrastructure that will not only improve personal lives, but also the economic capabilities and of all Arkansans.

To facilitate statewide broadband access, Connect Arkansas, a "delivery platform neutral" entity focuses on three major components: Determination of existing broadband infrastructure in Arkansas, Education, and Accessibility to computer devices. The first of these components, determining existing infrastructure, facilitates the requirements of the SBDD Program adequately.

Identification of Broadband Providers

As of March 1st, 2013, Connect Arkansas has identified by Holding Company name Seventy-Nine (79) Broadband Providers in the state of Arkansas. These providers are identified as having infrastructure in the state and are not identified as being resellers. Of these providers, Seventy-Two (72) submitted to Connect Arkansas at least partial data to map coverage. Of the remaining eight (7) Broadband Providers, six (5) have agreed to provide data in the future. HighTower Communications and Arkansas AirWaves are fixed wireless providers. CoBridge Communications sold infrastructure assets to Fidelity Communications, which has been submitted this round (note: as per Fidelity coverage area has changed significantly from the data listed as CoBridge). WildBlue(Excede) is now a service of ViaSat, Inc. and provided data. Almega Cable was removed from list as it appears they are out of business.

Data Collection and Processing

For the Spring 2013 data set all providers were contacted first via mail, then email, and finally with telephone calls to the point of contact for each company. Twenty-Three (23) companies updated coverage information as far as speed or coverage area. Twenty-Five (25) participating Broadband providers chose to display data as unchanged from the Fall 2012 NTIA Data Submission. Thirty-One (29) participating Broadband providers either were unable to update coverage information by deadline, or were unresponsive for this round of data collection.

The format of data collected has been in various formats as listed below:

ArcGIS Shape files
Tab delimited files of Address Ranges
Tab delimited files of Addresses

Physical maps of coverage
Tower information for propagation

Shape files were easily formatted to conform to standards in the SBDD Data Model.

All census blocks and Tigerlines (used for address range and address points) are based on the 2010 U.S. Census.

All tab delimited address files were geocoded using the ESRI geocoding engine in ArcGIS. These geocoding passes were used against the standard ESRI database, as well as U.S. Census Tigerline data, and Arkansas Geographic Information Office's Street Centerline and Address Points. In the rural areas of Arkansas the accuracy of geocoding is much lower than in urban areas. To help remedy this, Connect Arkansas reviewed the geocoding results with each provider, giving each the opportunity to correct any issues. Note: any geocoding results that fell outside of a providers existing telephone exchange or know service areas were discarded. From these results, nearest road centerlines or census blocks (less than 2 square miles) containing the geocoded points, were selected to represent the Broadband Providers Coverage. Note: only two (2) Broadband Providers provided data at the address level.

Any physical maps of coverage (including those submitted in .pdf format) were used as a basis to manually select line segments from existing road centerlines in the state (based on U.S. Census Tigerline data). From these results census blocks (less than 2 square miles) that contained the digitized road centerlines were selected along with the road centerlines in areas of larger census blocks, to represent the Broadband Providers Coverage.

In census blocks greater than 2 square miles, that also have had address points have been completed by Arkansas Geographic Information Office, Connect extracted and submitted the address points that corresponded to the adjacent street segments as produced based on the Broadband Provider's submitted data. Please note that at this time the Address Point base set for Arkansas is still under construction by Arkansas Geographic Information Office.

Fixed Wireless tower information (including Latitude, Longitude, Frequency, Power, and Height) were gather and entered in to EDX Signal software to model signal propagation. This software also took into consideration terrain elevation as well as ground clutter to accurately model the Broadband signal, in most cases to a twenty (20) meter degree of accuracy. These raw propagation models were processed in ArcGIS into more organically smooth shapes to conform to standards in the SBDD Data Model.

The results of the processes above were loaded into the SBDD Data Model and the latest CheckSubmission script was run. All resulting failed processes were analyzed and addressed to result in No Fails in Census Blocks, Road Segments, Addresses, or Wireless Coverage data sets (exceptions explained below).

Middle Mile information that was received (most Broadband Providers view Middle Mile as proprietary information and elected not to submit) as tab delimited text files or as a spread sheet in Microsoft Excel. This information was brought into ArcGIS, processed, then formatted to conform with standards in the SBDD Data Model and uploaded.

Community Anchor Institution data is information received from 3rd party sources in regards to institutions as outlined in the NOFA. Most of the data collected is from phone surveys to each location. In some cases difficulties were presented in finding a suitable technical point of contact to collect information. Arkansas Department of Information Systems has agreed to help provide information for public schools as well as HITArkansas for Health Systems, in future submissions. Only Community Anchor Institutions that could be geolocated were included. Arkansas Department of Information Systems has also informed Connect Arkansas that every K-12 school in Arkansas is connected with at least a T1 ADSL connection. In cases where phone surveys found additional connections or higher speeds this was submitted. Connect Arkansas is also including commercial locations with publically available broadband (typically via WiFi).

Verification Processes

Connect is currently using several methods to verify data collected. The format of data collected has been in various formats as listed below:

Telephone surveys
FCC released Form 477 data
Telephone Exchange Boundaries
Data collected from feedback on interactive Broadband map at www.connect-arkansas.org
Data collected from speed tests on www.connect-arkansas.org
Speed test data released from Broadband.gov
Spot field validation of Wireless technology

General Notes

All Census Block data is 2010 vintage, and all Road Segments are based on Tigerline 2010.

Connect continues to identify small providers, in particular fixed wireless providers that do not advertise or have a web presence. It is possible that several more of these providers will be identified in future data submissions.

It should be noted that in some cases relating to Cable Companies in Arkansas several of these described their Broadband Coverage area as "all streets within XX city limits".

In the case of CoBridge Communications, Fidelity Communications acquired the company or at least CoBridge's service area in Arkansas. Contact was made with Fidelity and a NDA executed. The mapping contact observed that much of the coverage area had been changed as they were under extensive updating of infrastructure. As of this data submission Fidelity has updated coverage, though it is very different from previous CoBridge submissions.

Several Cable companies in Arkansas currently report technology of DOCSIS 3.0, although the max speeds offered are well below the capabilities of the technology. This has been confirmed with the providers via in office visits, telephone conversation, email, or by letter. The reason for this is the lack of demand for higher speed tiers in their locations. The providers that fall in this category are Clinton Cable Inc., Comcast, Conway Corporation, Fusion Media, Ritter Communications, and Suddenlink.

In the past the Check Submission Tool also flagged Warnings for several DSL providers that offer speed tier 7 for DSL. These providers AT&T, PGTelco, Ritter Communications, TDS Telecom, & Yelcot Telephone all confirmed offering 10 Mbps or higher speed offerings via DSL. In some of these

cases, for example AT&T Uverse (high speed variant of ADSL implementing Fiber to the Node (FTTN)) speeds much higher than 10 Mbps are available. Also flagged for Warning was the T-Mobile's offering of speed tier 7, via HSPA+ 42 networks in limited areas. This technology is advertised to support speeds between 10Mbps to 27Mbps in some markets.

Warning flags have also been returned for Community Anchor locations that have Wireless technologies as the primary source of Broadband access. These results were from phone surveys conducted summer 2011, and have not been confirmed via survey due to budgetary concerns. This data will be verified in future surveys. However it is notable that in several communities in Arkansas it is not uncommon for an exchange of services in regards to Broadband access to take place. Fixed Wireless providers in some cases will provide service to municipal structures such as court houses and fire stations in return for access to infrastructure such as water towers, for placement of broadcast antennas.

The large number of Broadband Providers Submitted Maximum Advertised Speeds at the MSA/RSA level, or overall coverage areas which in some cases represent a large portion of land, in some cases several counties. At the direction of Andrew MacRae (Fall 2011) with NTIA, Connect Arkansas has pushed these speeds down to the census block and road segment level. Some inaccuracies can be seen in the data as actual Maximum Advertised Speeds in some cases vary from zipcode to zipcode in some cases. Also at the direction of Andrew MacRae (Fall 2011), in the case of large providers, Connect Arkansas attempted to obtain the max advertised speeds from the Broadband Providers' websites; the results of which follow:

CenturyLink

CenturyLink provide a system to check availability and speeds at address level. CenturyLink’s system allows users to select city, street, and address in sequence via drop down lists. After making these selections the user is brought to page that display Max Available Download speeds for that address. Upload speeds are not mentioned. The download speed is then recorded in the spreadsheet that has been provided for this purpose.

This process captured roughly half the cells. The remaining cells were then checked to see if there were duplicates in the spreadsheet and then filled in by researching the city associated with the ZIP code and checking it against the list of cities CenturyLink provides and filled accordingly. This process still leaves some ZIP codes with the appearance of being unserved. The speeds for these remaining areas were then based on speeds submitted on the MSA/RSA level.

AT&T

AT&T has a way to enter your ZIP code on their website while looking at the services they offer. However, changing the ZIP code doesn’t actually change the displayed services resulting in the premium U-Verse package being displayed for all areas including those that outside AT&T’s wireline service. As such, any data extracted from AT&T’s website is far less accurate than the speeds submitted on the MSA/RSA level. At the direction of Andrew MacRae, Connect also approached the mapping contact with ATT about more granular data, which the response was that all states received the same format of data and no additional data would be provided.

Windstream

Windstream's method for changing geographic location while browsing service packages on their website is quite easy to use, but it doesn't change any plan offerings. That is to say, the exact same 3, 6, and 12 Mbps packages are listed for every city chosen from their provided drop down menu. The data provided to Connect Arkansas by Windstream is considerably more accurate than that of the website. The speeds for these areas were then based on speeds submitted on the MSA/RSA level for Spring 2011, as Windstream declined to send new data at this time.

Cox

The location mechanism on the Cox website would not respond in any attempts to change it. That being said, the only download speed shown was done so in a general overview of all plans offered. No actual location dependant information was shared. The speeds for these areas were then based on speeds submitted on the MSA/RSA level.

Allegiance

Allegiance provides a list of all the cities they serve on their website, which then shows you the offered services for those areas. Download/Upload speeds were recorded for the areas that had internet services available.

American Samoa
Broadband Mapping Project:
Product Release White Paper

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Submitted By:	Kristin Rousseau
Contact E-mail:	**kristin.rousseau@broadmap.com**

Product Specification:	Spring 2013 NTIA Data Model
Product/Process:	NTIA—April 1, 2013 Data Deliverable
Dataset Submission QC:	NTIA—SBDD_CheckSubmission.py

Table of Contents

OVERVIEW

This white paper highlights the **Submission Summary** for this deliverable, as well as describes the **Data Gathering**, **Data Integration**, **Data Validation and Verification** and **Quality Control** processes used to create the Broadband Mapping Project's April 1st, 2013 data submission. To support varying levels of technical and program knowledge, both a **high-level summary** and a **detailed process review** are supplied.

SUBMISSION SUMMARY

PROVIDER DETAILS

PROVIDER PARTICIPATION

- Providers Included (DBA Name)
  - ASTCA
  - Bluesky Communications
    - Moana TV
- New Providers Since Last Data Submission
  - VCX Technologies
- Non-Responsive/Non-Cooperative Providers
  - None

COMMUNITY ANCHOR INSTITUION (CAI) DETIALS

OVERALL STATISTICS

Community Anchor Institution - Categories	Overall Count	CAIID Counts	Transmission Technology	Advertised Speed Down	Advertised Speed Up
Category 1 - School K through 12	49	27	0	0	0
Category 2 - Library	1	0	1	1	1
Category 3 - Medical/Healthcare	2	0	0	0	0
Category 4 - Public Safety	4	0	0	0	0
Category 5 - Universities/Colleges	1	1	1	1	1
Category 6 - Other: Government	26	0	7	7	7
Category 7 - Other: Non-Government	33	0	0	0	0
Total	**116**	**28**	**9**	**9**	**9**

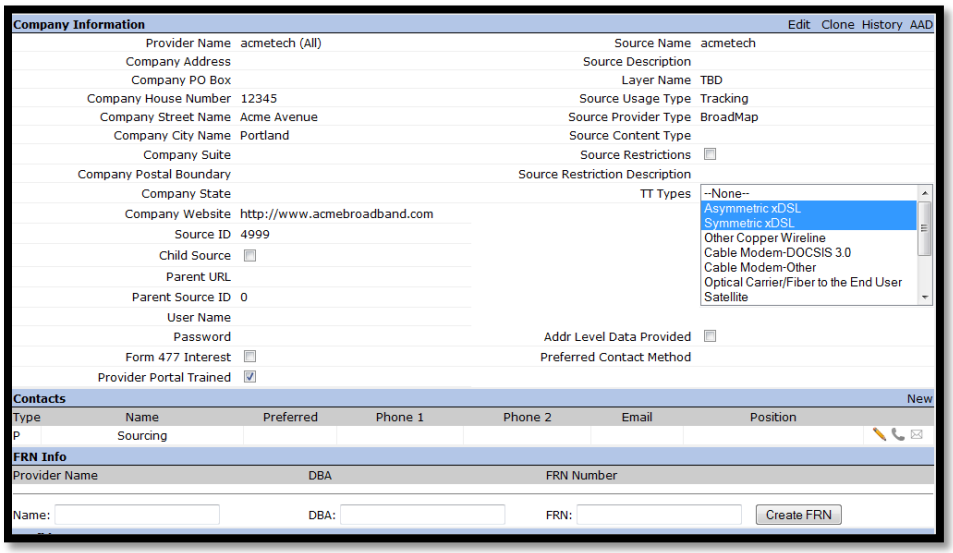
HIGH-LEVEL SUMMARY

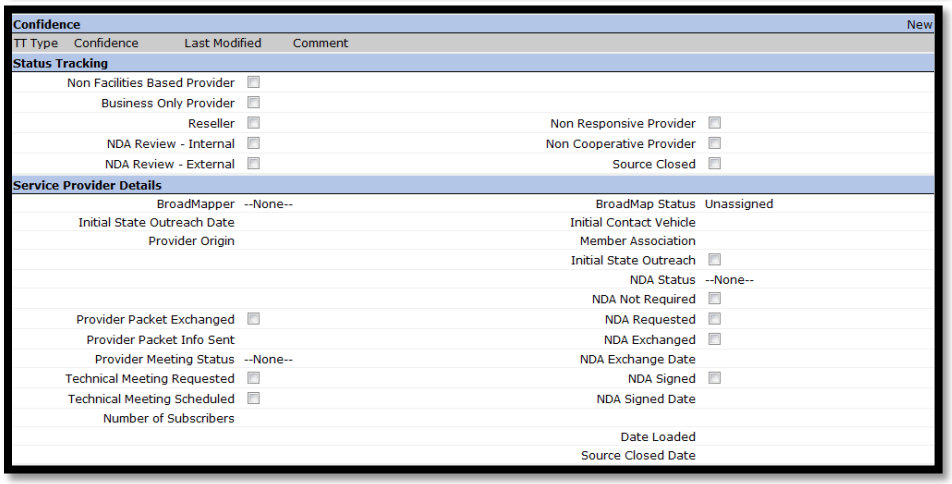
DATA GATHERING

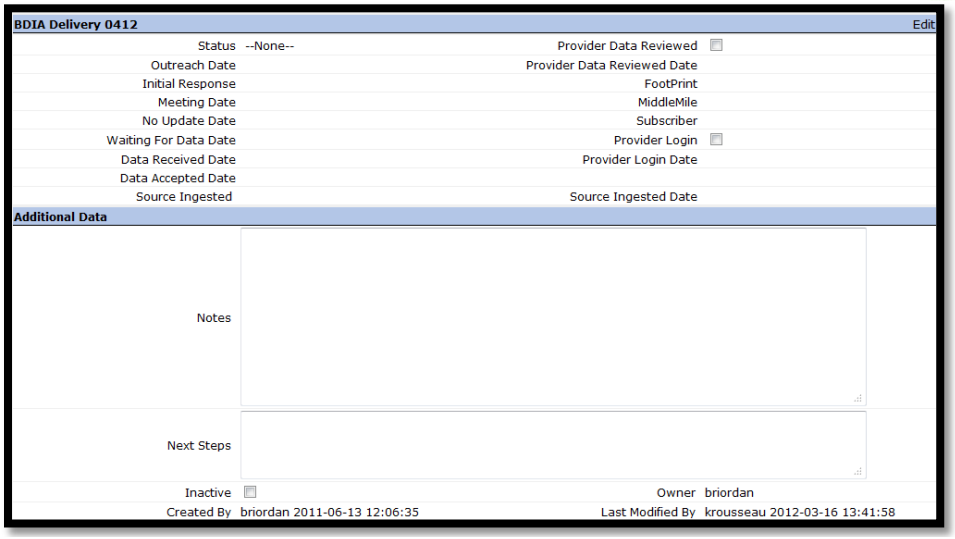
BROADBAND SERVICE AREAS, MIDDLE MILE AGGREGATION POINTS AND BROADBAND SERVICE OVERVIEW

The collection of Broadband Service Areas, Middle Mile Aggregation Points and Broadband Service Overview information is handled through the following Provider Outreach Process:

- Build and maintain an inventory of Broadband providers through research and State inputs.
- The inventory and everyday interaction with providers is tracked using our Provider Catalog (PCat). Below are some examples of the web application, which has a shared access between our team and mapping partner (BroadMap).







- Update provider material that describes the data requirements and logistics for data transfer.
- Update Non-Disclosure Agreement (NDA) for use in project, where applicable.
- Maintain multiple protocols for the provider to submit data, including Secure File Transfer Protocol (SFTP) technology when desired.
- Conduct one-on-one informational discussions with each provider to communicate the following:
    - Requirements of this project;
    - Broadband data required to support the product data model;
    - Submission protocols available;
    - Capability to validate how the supplied data is aggregated.
- Download/receive provider data.
- Establish a repeatable process with provider. Maintain provider communication, transaction and data handling records throughout the project (dates contacted, data received, etc.).

COMMUNITY ANCHOR INSTITUTION (CAI)

The collection of CAI information is handled through the following CAI Collection Process:

- Collect and maintain inventory of CAIs through data mining, research and State inputs.
- Maintain web-based CAI portal for institutions to add or confirm attribution, location and enter broadband-specific information.
- Upload web-based data to Core Database for standardization.
- Perform internal cleansing, such as removing duplicate records, identifying gaps in broadband attribution and verifying category.
- Geocode CAI locations.
- Translate Core Database data to deliverable-ready format.
- Continue engagement with non-responsive institutions.

DATA INTEGRATION PROCESS

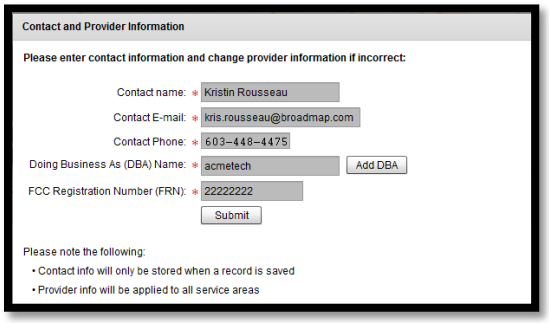
The data integration and processing mechanisms currently used allow for multiple types of inputs and result in a standardized output that meets the NTIA deliverable requirements. This flexible process supports data model changes and project-requested enhancements.

- Receive inputs from providers via submission protocols; upload into Sourcing Database and catalog with provider information.
- Review provider-supplied data for completeness and for potential discrepancies that require resolution prior to processing and flag as necessary.
- Categorize input into data-type category (addresses, block lists, paper maps, etc.).
- Standardize input based on data type within Staging Database.
- Create Compact Polygons (CP)—(internal methodology for generating area-based feature for coverage in Staging Database).
- Apply broadband attribution to CP; apply metadata to CP.
- Perform quality analysis of the CP against the source supplied to identify any completeness or accuracy issues.
- Request additional information from the provider if elements of coverage are missing or contain discrepancies. This is a second manual quality check to ensure data is complete.
    - Process coverage area to build the required NTIA data model layers.

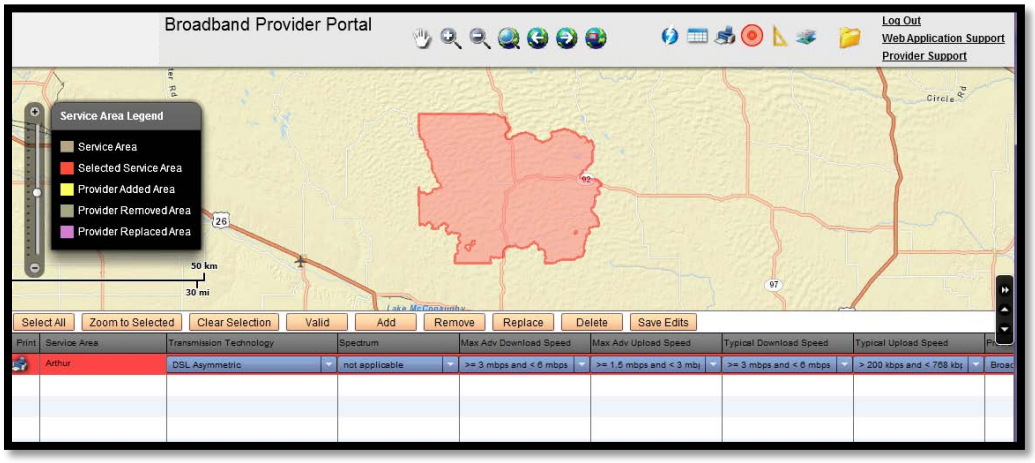
With the deployment of the Provider Portal this round, the data collection and later validation process was streamlined allowing both activities to occur within a secure web application. The majority of the providers used this methodology as it's allows them more visibility into how their data is being represented and gives them knowledge and ownership of their coverage representation. Below are some bullet points and supporting screen shots on how the portal is used.

- Each provider is assigned credentials with a strong password to ensure security measures are taken into consideration

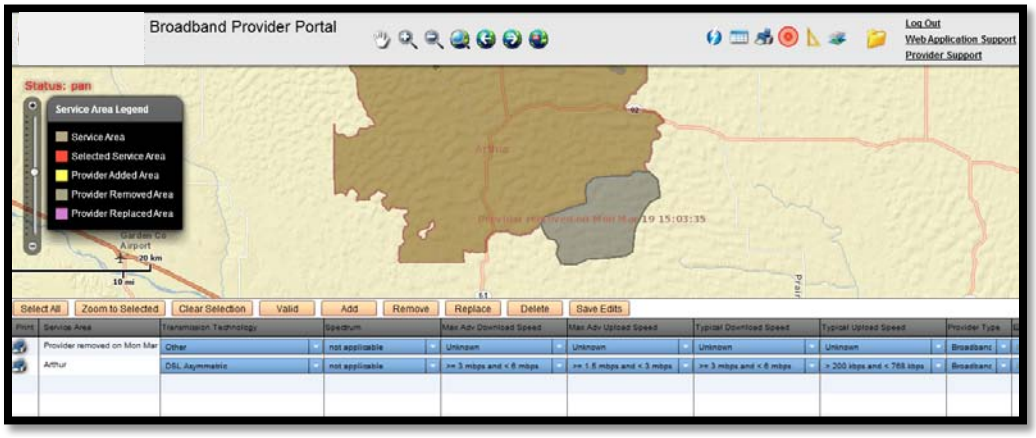
- Collection and confirmation our contact, as well as the company's DBA Name and FRN accuracy



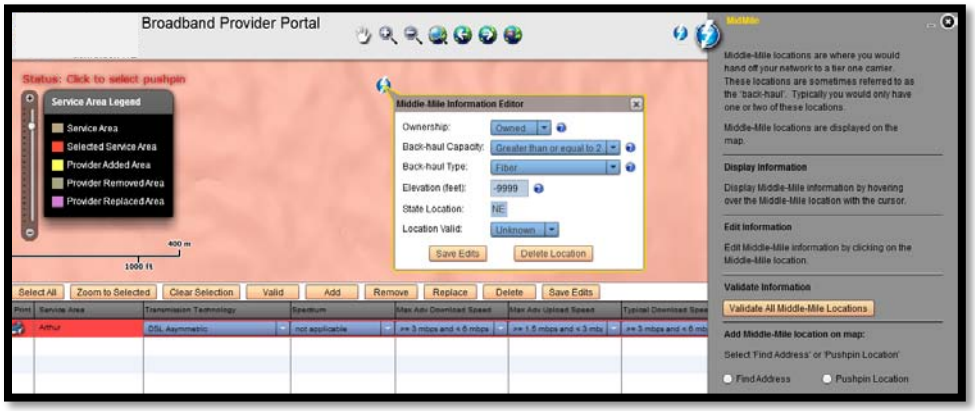
- Capability to review and request changes to the coverage footprint

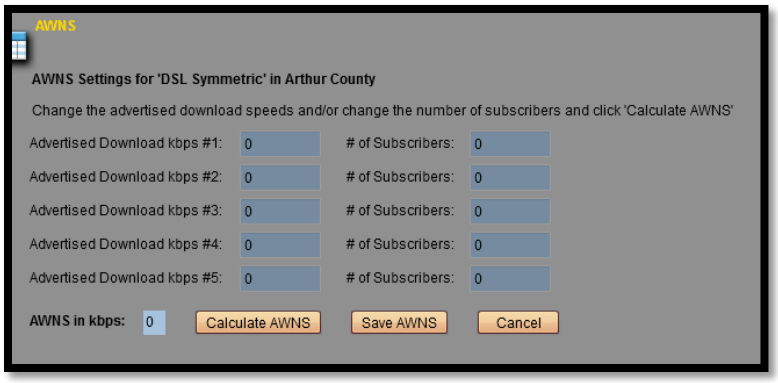


- The provider can Add/Remove portions, or all, of the footprint requesting that their footprint be increased or refined.

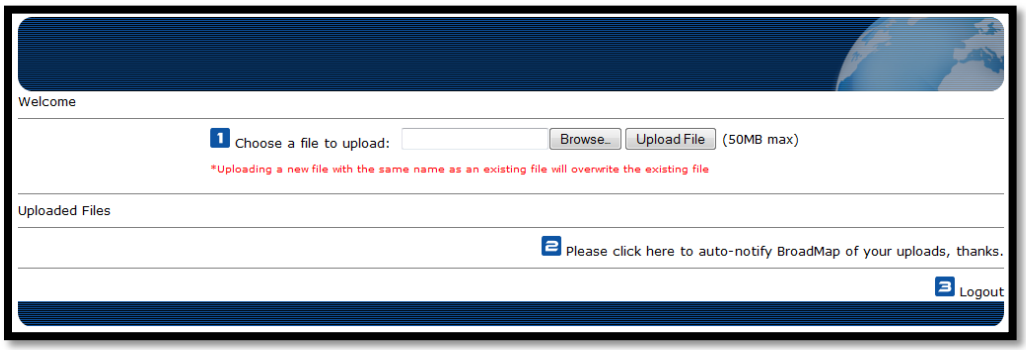


- Middle Mile and Average Weight Nominal Speed (AWNS) collection and validation





- File upload functionality to support providers that would prefer a shapefile, spreadsheet, PDF, KMZ/KML file be used to reflect changes for the data round



- Once the provider has review completed changes to their coverage, middle mile and AWNS, then can validate them all signing off that everything is accurate.

DATA VALIDATION AND VERIFICATION

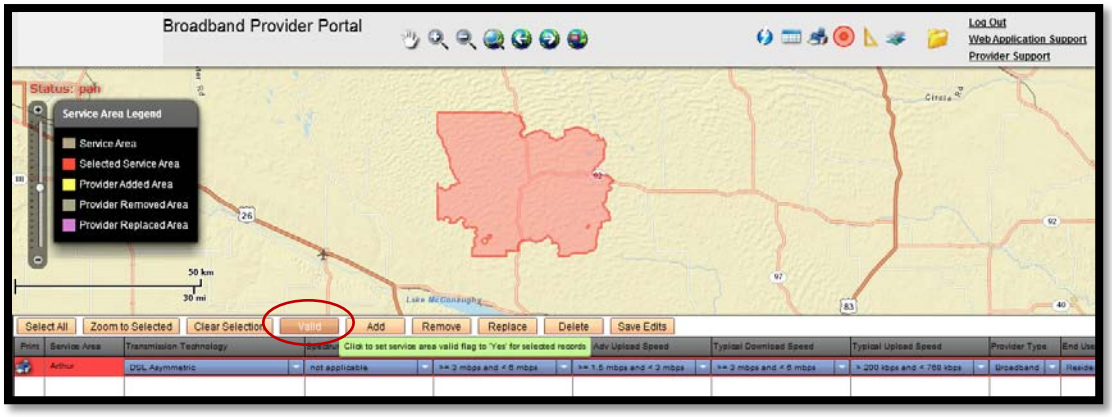
Following the creation of the product, process steps within Data Validation and Verification occur. To ensure the data collected and processed is as accurate and comprehensive as possible, provider validation and internal verification activities are employed. After the initial mapping of providers' coverage areas and serviceability claims, additional reviews are performed using the methods described in the subsections below in order of action (**Broadband Provider Validation**, **Third-Party Data Verification**, **Public Verification, and Confidence Values**).

BROADBAND PROVIDER VALIDATION—PROVIDER PORTAL APPLICATION

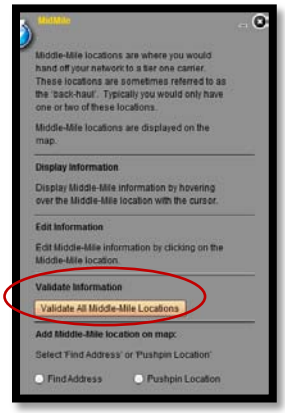
Providers are trained on and requested to use a secure interactive web application to review their current coverage area(s) and supporting broadband attribution and validate their data or submit change requests to update their data. All provider change requests go through the **Data Integration Process** and are reviewed with the provider to complete validation.

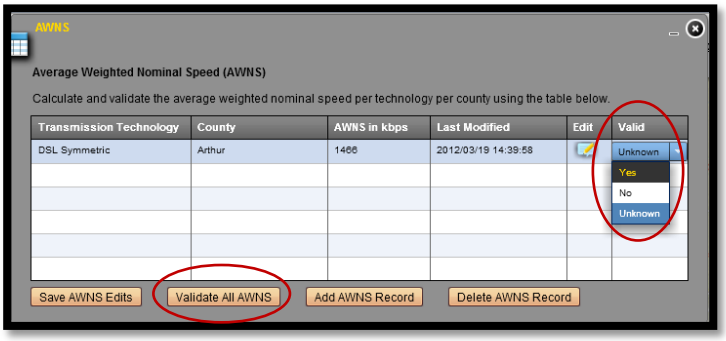
With the latest released of the Provider Portal, validation on the coverage area, middle mile and average could be completed individually. Validation examples are as follows:

- Coverage validation can be done on one record/footprint at a time or by selecting footprints and selecting the 'Valid' button. The provider could also print off their coverage for their own tracking purposes.



- Middle Mile & AWNS Validation





All validation results are tracked internally through our Validation Table, which also improves the overall **Confidence Value** as mentioned below.

THIRD-PARTY DATA VERIFICATION

For this submission, the NTIA 3rd Party Data summary was reviewed again to ensure any corrections required were represented in the final product and the supporting documentation. This includes additional feedback received directly from NTIA, prior to this data submission.

This submission was also compared to the previous data submission, October 2012, as a quality check to identify and resolve any potential erroneous discrepancies between the two products.

PUBLIC VERIFICATION

The broadband interactive map has been released to the public, which includes functionality to collect feedback on the provider's coverage areas, as well as running a speed test. The feedback and speed results are collected and reviewed with the providers prior to the next data submissions to identify if any map refinement is required.

The public website can be viewed at the following hyperlink:

http://asbb.broadmap.com/PublicMap/

CONFIDENCE VALUES

All verification, validation and manual quality review results are tracked by provider/technology type and stored and maintained within a **Validation table**. A confidence value is assigned, based on internal assessments of the collected information, to highlight the provider coverage areas and/or attributions that would benefit from further investigation and/or enhancements.

With the continued efforts on provider validation, 3rd party verification and the release of the public interactive map with feedback collection functionality, the confidence values will continue to be utilized further to identify specific areas in need of attention.

QUALITY CONTROL

Following collection, processing and analysis of the provider and CAI data, the product is checked manually and algorithmically against the NTIA data model. Some of the items included within these checks are:

- Format correctness;
- Table and field structure;
- Valid values, including default values, where applicable;
- Geographic extent and topology errors.

Prior to data submission, another quality control script supplied by NTIA is run. This script, SBDD_CheckSubmission.py, creates an output in text form that is required to be submitted along with the final deliverable. All errors must come up clean, unless otherwise specified by NTIA.

DETAILED PROCESS REVIEW

To review the detailed process, please review the attached object:

BMap_ProcessDetails_2013_04_01.docx

State of Arizona

Arizona Broadband Assessment Project (AZ BAP)

Methodology White Paper

Submission 7 - April 1, 2013

State of Arizona

Arizona Strategic Enterprise Technology Office (ASET)

Arizona Broadband Assessment Project Methodology White Paper

Submission 7 - April 1, 2013

Table of Contents

Arizona Broadband Assessment Project Overview

The purpose of the Arizona Broadband Assessment Project (AZ BAP) is to identify both the availability and speed of broadband services, and the location of broadband infrastructure throughout Arizona, including middle mile infrastructure and Community Anchor Institutions (CAIs). This project is provided through the American Recovery and Reinvestment Act of 2009 (ARRA) and the Broadband Data Improvement Act (BDIA), and in conjunction with the National Telecommunications and Information Administration (NTIA) and the Federal Communications Commission (FCC). AZ BAP is managed by the Arizona Strategic Enterprise Technology Office (ASET) under the Arizona Department of Administration (ADOA) in partnership with the Arizona State Land Department (ASLD), contractor Data Site Consortium, Inc. and their GIS subcontractor, TerraSystems Southwest (TSSW).

Submission 7 for the broadband availability and CAI data set was duly submitted to NTIA prior to the April 1, 2013 deadline. Spring 2013 was the seventh of ten semi-annual submissions by the State of Arizona and attempts to capture and reflect broadband availability and conditions in the field as of December 31, 2012. See Appendix A - Arizona Broadband Provider Changes & Corrections Document for a list of included Broadband Providers and relevant notes for each.

Broadband Data Description

For the State of Arizona broadband availability data set submitted to NTIA April 1, 2013, the summary of the data submission follows:

BB_Service_CensusBlock - 457,560 Census 2010 polygons less than or equal to two square miles in area representing the service area of 38 broadband providers (unique FRN's). Multiple instances of a census block polygon may exist where a provider has two or more technology types and/or end-user categories in a block or multiple providers have service in that block. Only the fastest upload and download speeds in a census block are reported for a given provider, technology type and end-user category. Some providers supplied a list of census blocks they serve, while others reported their service as a list of addresses or as census blocks/road segments or a service polygon in KML or shapefile format. Addresses were geocoded using a combination of local, TIGER 2010 and Navteq road networks and then aggregated to census blocks. Footprint geography was used to select the underlying census blocks using a "centroid in" rule.

BB_Service_RoadSegment - 59,964 TIGER 2010 road segments that fall inside Census 2010 polygons greater than two square miles representing 27 broadband providers (unique FRN's). Multiple instances of a road segment may exist where a provider has two or more technology types or end-user categories on a segment or multiple providers have service on the segment. Only the fastest upload and download speeds on a segment are reported for a given provider, technology type and end-user category. The TIGER segments have all been clipped to fit entirely within a census block. Local road networks may overlap into the census block geography. The address ranges were not interpolated to accommodate any clipping. Some

providers supplied a list of TIGER road segments they serve by TLID number, while others reported their service as a list of address ranges or as a road segment or service polygon (KML or shapefile). Address ranges were geocoded and then aggregated to census blocks. Footprint geography was used to select the underlying road segments using a “centroid in” rule.

BB_Service_Wireless - 35 wireless service area polygons representing 35 broadband providers. Polygons fully or partially overlap where a single provider offers service over two or more technology types or spectrums or where multiple providers offer service in an area. Only the fastest upload and download speeds are reported for a given provider, spectrum and technology type. Wireless providers submitted their service area in either KML or shapefile formats. In some cases the Arizona Broadband Mapping project consultant “reverse engineered” a service KML file from publicly available data sources on tower locations, technology types and spectrum information. These service areas were shared back with the provider with varying levels of response.

BB_Service_MiddleMile - 842 middle mile points representing 21 broadband providers. Middle mile points were generated from provider data using either latitude/longitude or address information. Elevation attributes were added by overlaying a statewide 10-meter Digital Elevation Model and moving the elevation attribute into the database.

Broadband Provider Participation

Broadband Providers Included

During this cycle we received data from a total of 76 entities, which included 58 Broadband Providers (BPs), 10 resellers and 8 entities classified as Other. There were 2 BPs who refused to participate and provide data. Those who were non-responsive included 29 BPs and 1 reseller.

For more details see Appendix A - Arizona Broadband Provider Changes & Corrections Document for a list of included Broadband Providers and relevant notes for each.

Broadband Providers Identification Strategy

The process of identifying BPs in this cycle consisted of verifying that BPs participating in the previous cycle are still relevant and under the same ownership, as well as identifying previously unknown BPs through referrals, research, and analysis of speed test results. The whole nature of the Arizona Broadband Assessment Project (AZ BAP) revolves around data collection from relevant BPs, thus the comprehensive identification of relevant BPs active in the Arizona market and definition and determination of relevancy are the key steps in maintaining an up to date universe of target BPs for subsequent engagement. Additionally, since the market is dynamic, as BPs go out of business, merge, startup or otherwise transition, an ongoing strategy and actions for adding to and updating the relevant BP universe is required. We maintain a not-in-play list on the wiki to assist in properly classifying BPs over time and codifying our research, interactions, and findings.

Broadband Providers Engagement Strategy

The initial E-Mail Communications Package was developed as a collaborative effort among Data Site Consortium Inc. (DSCI), Arizona Strategic Enterprise Technology Office (ASET), and Arizona State Land Department (ASLD). It included an introductory cover letter under the signature of the ASET Director (State of Arizona CIO), followed by a more detailed and specific letter from DSCI, a copy of the standard project NDA, and an Arizona Broadband Provider Technical Appendix. The two letters give the project explanation, value proposition, and call to action with the NDA and Technical Appendix yielding expanded and supporting documentation.

In subsequent data collection cycles, DSCI has developed a series of standard cover letters that are adapted as needed (perhaps based on elements from previous conversations or presentation of anomalous findings) to comprise the body of the personalized letter and cover e-mail for transmittal at the beginning of the "data ask" cycle. DSCI fields any BP responses by e-mail, letter, phone, or in-person, answering any questions from the provider and moving towards their fresh data submittal.

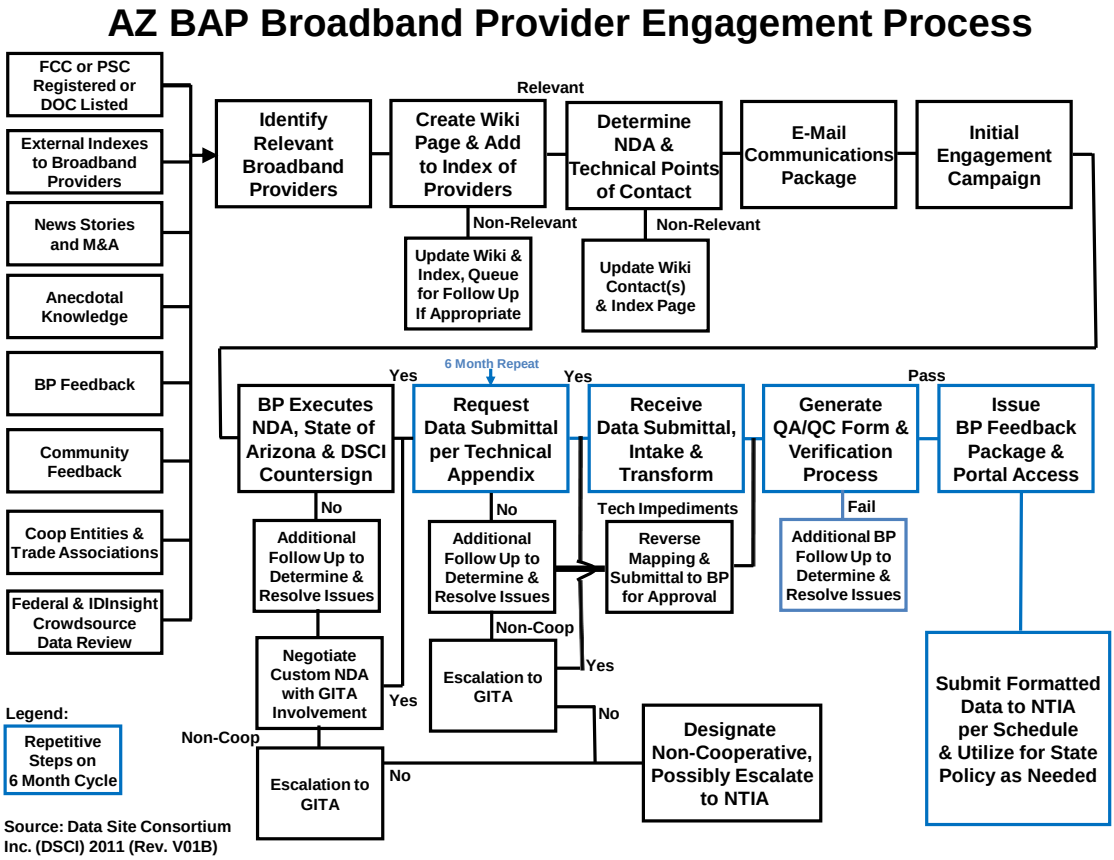
A Data Ask Letter goes to the majority of participating BPs who have submitted data in past cycles. A variant, the BP Reverse Mapping Letter goes to another dozen or so participating BPs whom we reverse map and then work with to verify. Another variant, the BP Cooperation Letter only goes to newly identified BPs whom we are seeking to engage and get under NDA. The Technical Appendix is included as part of the package to all BPs.

Some of the salient points covered in this cycle in the communication package to the BPs include the following:

- Every cycle our team holds extensive collaborative review sessions in a GIS environment to evaluate and verify a BP's data. We have found including BP representatives in these sessions to visually and interactively review their data submittal with us proves beneficial to all. It allows corrections and adjustments to be made in real-time and helps assure the high data quality. We seek to schedule such a session with BPs interested in reviewing their data or when needed to help resolve questions and noted anomalies.
- As broadband technologies and deployments continue to evolve, the NTIA has expanded and/or shifted the acceptable speeds for some technology types. We request that BPs refer to the current Technical Appendix and its speed vs. technology type chart especially and specifically note if they're now delivering higher broadband speeds than previously.
- Some Broadband Providers have submitted incremental information in the past. We ask that BPs submit a complete current estimate of their Arizona broadband coverage each cycle. Complete coverage submittals are easier to process and less error prone.
- Additionally, the State would like to collect information as to the actual customer addresses passed (addresses that BPs can provide service to in under 7 days) or customer addresses served by them. This would allow for more detailed analysis to inform policy directions, but is not provided by most BPs.

After a BP's data has been transformed and put through the verification process, a BP Feedback Letter is prepared and sent noting any issues or anomalies accompanied by a series of map visualizations and an invitation to follow up with any questions, corrections or concerns.

Below is a diagram that illustrates the overall Provider Engagement Process.



Non-Disclosure Agreements (NDA)

NDA Overview

Because initial NDAs between the State of Arizona and our providers had a two-year term, we needed to generate new NDAs with our providers for Years 3-5 of the program. We continued this activity and have renewed NDAs with 38 of our providers. We will continue this effort until we have fully executed NDAs with all providers that so desire. While some BPs opted out of the NDA process, the majority chose to participate, by negotiating and signing a new NDA. The providers that chose to opt-out fall into two groupings. A first group consists of providers that were not sufficiently concerned with possible misuse of their data to be motivated to execute a NDA. All providers within this group provided data as required for the submittals to date. A second group consisted of providers that chose to largely boycott the mapping process. Members of the second group generally have not provided data. However, we have been successful in interfacing with the majority of these providers via our reverse mapping processes wherein we obtain relevant data from third party sources and present the data to each provider for discussion and corrections before incorporating it into the biannual data submittal.

NDA Considerations and Related Rationale

Within the context of the Program, we have deployed a NDA when sharing confidential information between or among trusted parties. The NDA utilized comprises an agreement wherein the provider, the discloser of the information, achieves specified safeguards and the receiver of the information is allowed specific uses of the information for a specified period.

Generally, we have included both the safeguards and the specific uses, and have framed these constructs within a consistent set of duties and obligations to which the parties mutually agree. Important Program NDA framing issues include:

1. **Definition of the parties and their respective objectives (generally whereas statements)**. Generally the Program NDAs are construed between a disclosing party (generally a Broadband Provider) and a recipient party (generally the State), wherein the disclosing party may be an owner of the confidential information or merely may have a present right-of-use of the information.
2. **Definition of the confidential information**. Generally, the parties negotiate what information is confidential. This negotiation generally strikes a reasonable compromise between the information discloser wants for broad inclusive language and the recipient's desired narrow and specific language. Often such definitions are constructed so as to include both general categories of information followed by specific instances within those categories.
3. **Exceptions to confidential information**. Exceptions described both as general categories and specific instances are equally important to adequately characterizing the confidential information.
4. **Ownership of the confidential information**. Often the confidential information provided by a disclosing party will not be owned by that party, but is rightfully possessed under an existing license or similar right-of-use of the information. Thus, such limitations must also be described, appropriate indemnities devised, and notice provided to the underlying property owner associated with the confidential information.
5. **Definition of obligations of confidentiality**. Obligations of confidentiality focus to acceptable use and unacceptable misuse of the information provided by the recipient. Such obligations often also cover secondary disclosures by agents of the recipient with appropriate need-to-know requirements and recordkeeping.
6. **Exceptions to the obligations of confidentiality**. Confidential information by its nature must be confidential to someone or in some respect. Once such information loses its confidential nature, it generally becomes freely available to all comers. Because information that is initially thought to be confidential may not be so, the NDAs delineate such exceptions. Thus, the NDAs list specific means under which disclosed information is not deemed confidential, such as the disclosed information becoming publicly known by acts of others or discovered by the recipient by other means.

7. **Definition of what constitutes breach of the agreement**. Gravamen of breach of NDAs centers on intentional and unintentional disclosure of the information within the established term of the agreement. Related considerations include materiality of a disclosure and whether it is volitional. The NDAs identify the types of breach in detail. As with the definition of confidential information, the NDAs also specify instances that do not constitute breach.
8. **Agreement of available remedies for each type of breach**. Generally, all breaches require that the breaching party immediately notices the disclosing party of such breach. Such notice should occur in sufficient time that the disclosing party can intervene for protecting its rights to the confidential information where possible. Further, it is appropriate that the recipient agree that certain breaches equate to irreparable harm to the disclosing party, giving the disclosing party injunctive rights. Money damages may also be appropriate or the immediate return of all confidential information to the disclosing party. The NDAs generally minimize language relating to money damages.
9. **Term of the agreement**. A NDA term generally entails defining a period required for the parties to effectively disclose and utilize the information here initially a 2-year term, followed by a 3-year term. At the end of the term, and potential extensions, generally the recipient must either return or destroy all confidential data and provide an affidavit to the disclosing party that it returned or destroyed the information. Typically, the NDAs also include a second, longer term during which the parties will agree to maintain confidentiality of the information
10. **Miscellaneous issues**. These issues include agreed to law, integration, assignment rights, notice addresses, dispute resolution means, and the like by the parties.

Data Collection and Integration

Primary Data Collection

Overview

DSCI solicits and receives the BP broadband data submittals, doing intake processing and usability crosschecks. DSCI's GIS subcontractor TerraSystems Southwest (TSSW) corrects any format issues, transforms the data to prepare it for federal submittal, documents the technical steps performed during that preparation for quality assurance and BP feedback, leads the team in collaborative data verification sessions, as well as supports further State use of the data in mapping and policy processes.

Reverse Mapping Role & Processes

The use of reverse mapping was key to depicting broadband coverage for: Broadband Providers unable to supply coverage area information; Broadband Providers with incomplete coverage area information; and Non-responsive Broadband Providers. Regardless of the scenario, DSCI and TSSW employed a number of logical methods to derive "where and which" broadband

services a Broadband Provider likely had available. Some of the key elements used to initiate reverse mapping included:

- FCC Form 477 data, though dissolving census blocks greater than 2 square miles into applicable road segments required special techniques and attention
- Central Office (CO)/Digital Subscriber Line Access Multiplexer (DSLAM) location (wireline) - used in conjunction with distance buffers to best determine "where" outside plant infrastructure would reside. We used multiple public information sources to discover CO and DSLAM locations.
- Tower location (wireless) - used propagation models to determine "coverage/reach" based on services provided (frequencies, lat/long, terrain). We used an “E-coverage” tool from Wireless Applications Corp as well as “Radio Mobile’s” radio frequency coverage tools.
- Service Book/Offerings - usually determined through publicly available information (technology of transmission, speeds, etc.).
- Tribal boundary information (From FCC) - GIS shapefile used to determine Tribal boundaries and census blocks/road segments contained therein.
- Public Information Sources - from various sources including BPs’ own websites to provide a "picture" of their network, services, and coverage.

Such reverse map estimations of the BP’s coverage and technology are then presented back to the BP for confirmation or feedback leading to iterative adjustments, sometimes via collaborative online viewing sessions, and resulting in a “best guess” for their current delivery footprint. BPs without current GIS capabilities were frequently impressed with our techniques and interested in using the reverse mapping outputs internally and externally.

Data Intake and Validation Application (DIVA)

DIVA Overview

The Data Intake and Validation Application (DIVA) was developed by TerraSystems Southwest (TSSW) as a subcontractor to DSCI under contract with ASET in support of the Arizona Broadband Assessment Project (AZ BAP). DIVA is a Windows desktop application designed to transform raw Broadband Provider data about the location, technology and speed of broadband services into a form that can be cleanly linked to GIS layers and imported into the NTIA standard national broadband mapping program geodatabase.

A key goal of the DIVA design was to reduce data processing time while increasing data integrity. A secondary goal was to create a freely distributable software tool that Providers and other State broadband organizations could apply to their data intake and validation tasks. Alternative approaches, such as integrating with ArcGIS or data translation software like FME were not pursued as that would mean users would have to purchase those products at a significant expense while DIVA was specifically designed and tuned for the task at hand.

DIVA does not perform any spatial validation or processing. DIVA was scoped as “pre-GIS” software, designed only to speed and improve the processing of Provider data to a point where it could be more cleanly geocoded or linked to NTIA GIS layers. Based on this design criteria, DIVA is not very useful for wireless service shapefile deliveries where the feature counts (data Records) are a couple of hundred, or less, and are in more or less proper SBDD format. However, it really shines in processing address, census block, and road segment submittals of tens or hundreds of thousands of records, and where Providers have not followed the SBDD coding scheme.

DIVA Capabilities

DIVA offers a rich user interface for exploring and processing Provider broadband data into a form that can more easily be linked to NTIA-required GIS feature classes. Some of its key features are listed below.

- Configurability - DIVA offers many opportunities for configuration. New Provider identification information can be imported and applied to every Provider submittal. New releases of the SBDD geodatabase are read and up-to-date Rules are automatically created and applied. Processes and Rules in DIVA are very general and may be user-configured to achieve various results.
- Consistency - a very structured approach to data processing is embedded in the design of DIVA. This begins with the clear definition of data elements and their relationship to one another in an Object Data Model. Consistency is also inherent in the clear definition of Processes and Rules that can be applied to the data and in the way that Processes and Rules are used to transform and validate the output data. In the rush of meeting data-delivery deadlines it is easy to forget or misapply data processing steps. By automating much of the required processing, DIVA increases the amount of time that a user has to actually review and check data, and makes it easier for the user to achieve consistent results in the exported data sets.
- Re-usability - Users can define a set of Processes within a particular Reporting Period as a Template and then apply the Template to new Input Files. Rules are uniformly applied to Providers for each Reporting Period. This includes user-defined rules: once defined and applied, they will automatically be applied to subsequent Submittals.
- Processing Documentation - metadata (e.g. notes) regarding Providers, Submittals, Input Files and other elements may be added at any time using the “Edit Metadata” button on the Status Bar. Notes can be viewed or exported at any time for cutting and pasting into NTIA documentation. These notes, plus the actual Input File(s) associated with a Submittal, the assigned Processes, Rule violations and final output, constitute DIVA’s Metadata system. A good example of metadata stored in a Process is the translation table from Provider actual speed values to NTIA speed tier codes: the value mapping is preserved and can be reviewed in DIVA by opening up the applicable Submittal and generating a detailed Input File report or by right-clicking on the Translation Process in the Processes tab.

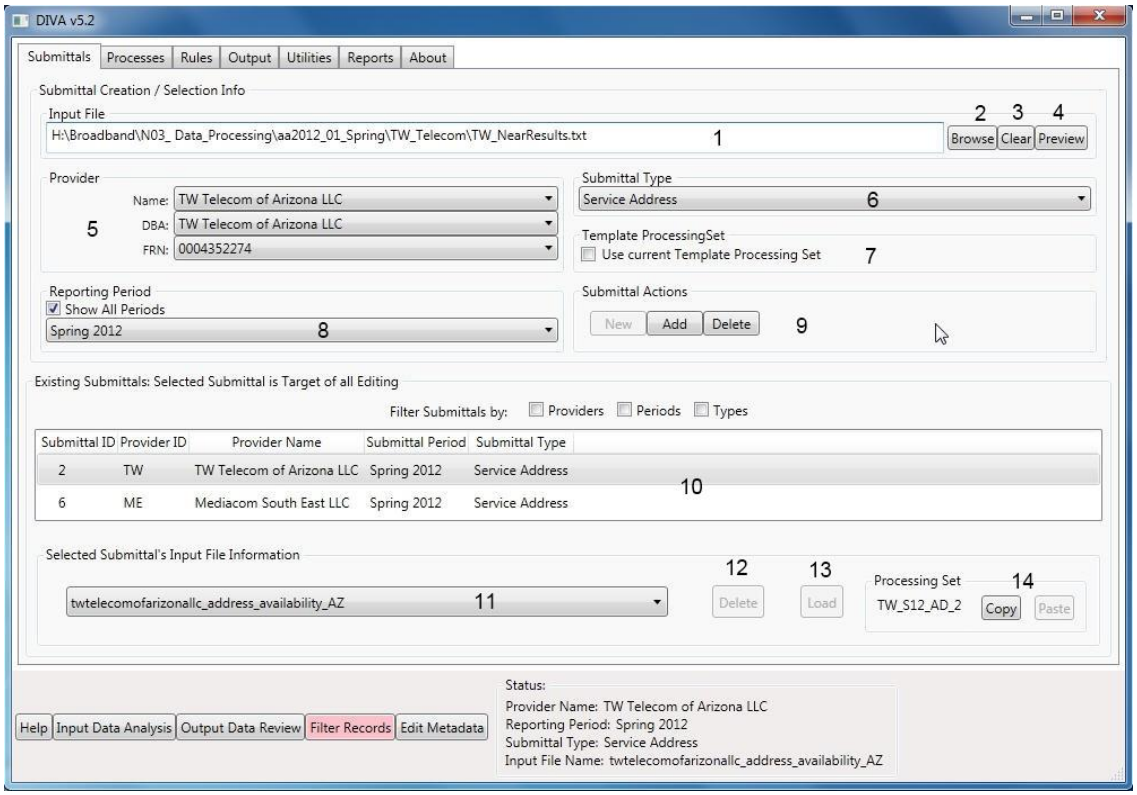
DIVA Impact

The efficiencies resulting from the application of DIVA to Provider data are substantial. In the first submittal period in Spring 2010, a number of larger providers would consume 24-40 hours of processing time to evaluate, transform, quality check and export to SBDD database format. Processing a similar set of data in the latest submittal period (Spring 2013) using DIVA is a 2-4 hour process for even the most complex BP data submittals.

A substantial portion of this improvement is the result of (a) knowing the data and what to expect from a given Provider and (b) improved manual processing, especially on the GIS side. However, another substantial portion of the improvement has come from the integrated data evaluation, checking, transformation, and validation and export capabilities of DIVA itself. We estimate that DIVA can reduce processing time in half for large address or census block submittals from the Providers. This efficiency is gained from having all the evaluation, transformation and validation tools available in a single interface instead of applying a variety of application software packages in varying order to each Provider file in each Reporting Period.

DIVA was designed and implemented to be quite portable and readily usable by other grantees. North Carolina has requested detailed technical information on DIVA and the NTIA and other grantees have expressed interest. Arizona is glad to share all relevant information and source code, including a comprehensive user manual as well as guidance in implementing the application to other grantees at no cost. The only real caveat is that we can offer only quite limited tech support without specific coverage of costs for time spent.

Below is an image of the control panel for the submittals tab, which contains all the controls a user needs to manage the intake of provider data.



Community Anchor Institutions (CAI)

Data for the Community Anchor Institutions (CAIs) resides in many different locations throughout Arizona and were collected from data custodians and/or data integrators throughout the State. This effort has two major components, the identification and geo-location of the CAI entities and the collection of data related to the status of their broadband usage. Both of these components have significant challenges for development and maintenance. The State does not currently have any centralized databases that could serve as a core basic backbone for CAI data development. Thus a sizeable data collection and standardization effort has been undertaken and matured over time. The Arizona Broadband Assessment Project (AZ BAP) provides impetus for one of the first State efforts to consolidate CAI data into one database.

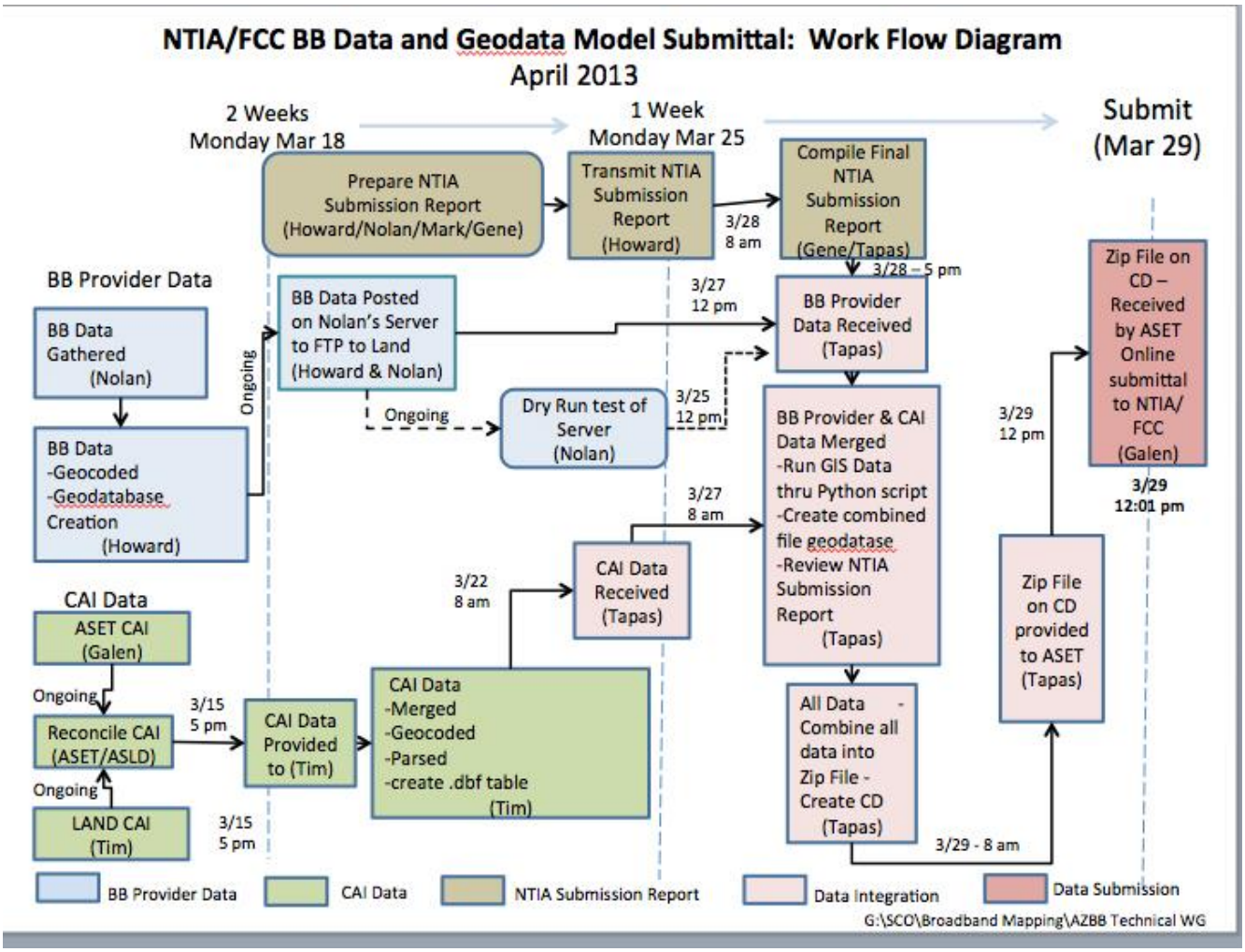
A considerable effort in basic data development working with local government websites and one to one contacts has been required to address some basic aspects of the CAI data collection. Numerous organizations in Arizona maintain locational information regarding some categories of CAI data but these are all of varying formats and currency. In many cases the project has had to assist CAI location data custodians in the update of some aspects of the basic locational data. The Project also is, in most cases, the first time that CAI managers have developed information regarding the level of broadband services for their institutions. This poses a host of challenges regarding a large number of existing processes in many organizations.

ASET has added a number of additional CAI record elements in a variety of separate spreadsheets for different categories of CAIs. A sample of such additional record elements from the preparatory files for the Spring 2013 submittal are included below, though the files are stripped back to NTIA CAI data elements before submittal. A complete list of additional variables (spreadsheet column names) for Arizona's CAI extensions from a sample Spring 2013 preparatory spreadsheet is shown below for reference:

OBJECTID	ZIP5	Rur	NOTES_ACTU
KEY_	ZIP4	BB1_BBIS	AZ_BB1_UP_
KEY_NUM	ADD_SRC	BB1_ISP	AZ_BB1_ACT
OLD_KEY	PHONE	BP_LNAME	BB1_DWN_MB
CTDIS	TYPE NOTES	BP_FNAME	BB1_DWN
AGENCY_COD	CAICAT	BP_EMAIL	BB1_POS
ANCHORNAME	PRE_CAICAT	BP_PHO	BB1_COST
ADDRESS	SUB_CAICAT	OTHER_INFO	BB_DOL_MBP
BLDGNBR	CAIID LL_MET	INFOSRCCOM	BB1_NOTES2
PREDIR	LL_DATE	BB1DMARC	BB1_NOTES
STREETNAME	GC_TYPE	AZ_NUM_CIR	Lat1
STREETTYPE	GC_ERROR	BB1_DATE	Long1
SUFFDIR	GC_FIX	NOTES_BB1_	Longitude
CITY_1	FULLFIPSID	BB1_PIPE	Latitude
COUNTY	FK	BB1_UP_MBP	
STATECODE	FKGOV	BB1_UP	

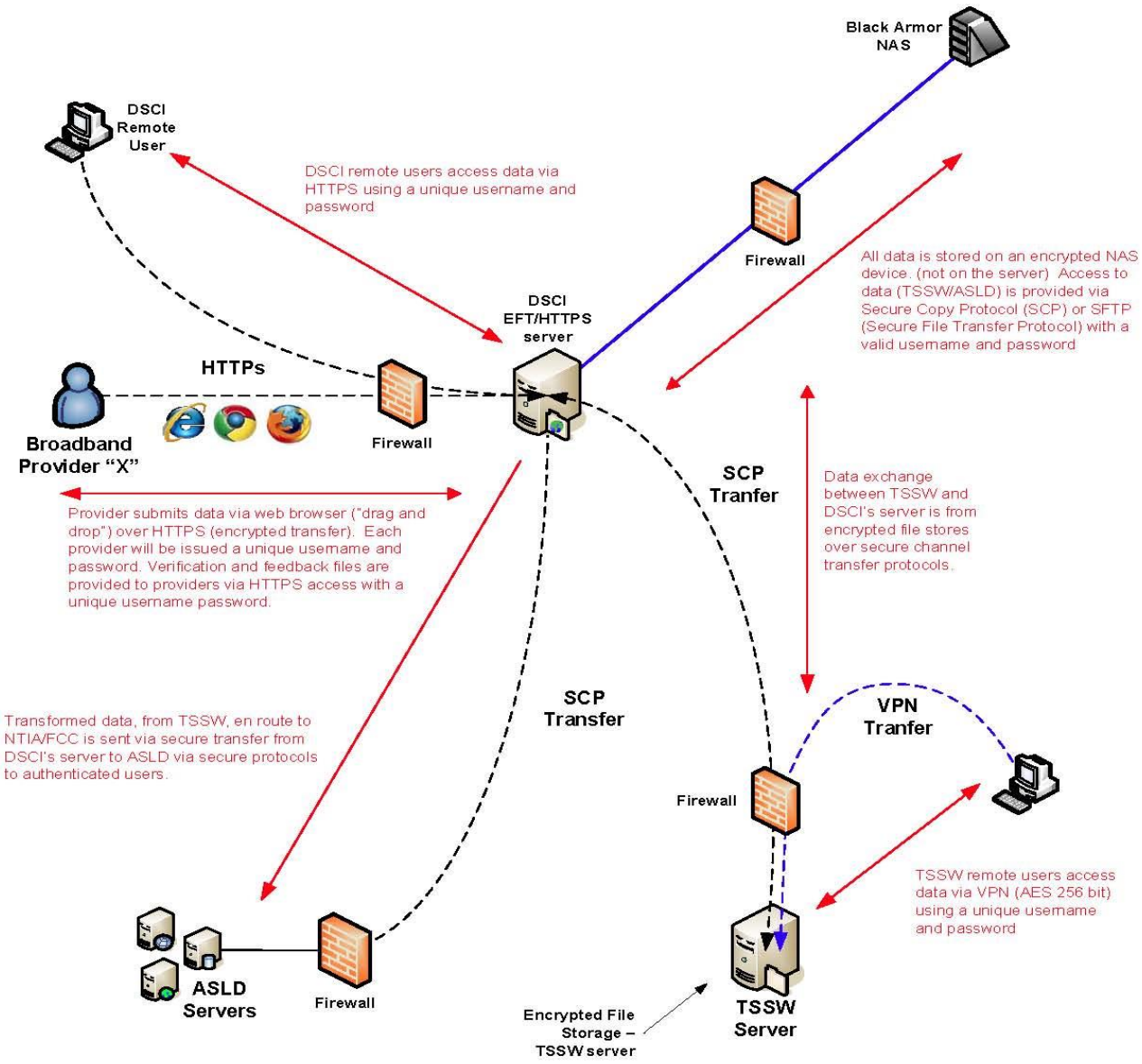
Project Data Flow and Security

In order to provide a timely submittal ASLD maintains a workflow and dataflow process depicted in the diagram below with designated responsible parties to establish timelines for the completion of significant tasks. This process is updated and modified as needed for each submittal.



DSCI provides a secure web browser-based portal supporting the Arizona Broadband Mapping Project. To submit data the BP user logs in to the portal on the server, which can only be accessed by a unique username and password. The BP may use any web browser (Internet Explorer, Firefox, Safari or Chrome) to access the portal. After a successful login, the BP can "drag and drop" files to the browser window for upload. The BP user account is deactivated after successful transfer. The data is stored on an encrypted device in a secure facility. After data transformation and data examination and correction, along with related processing, the data is made available for review and verification by the BP user. The BP user can access and review the transformed data (as formatted for federal submittal in GIS readable format) and derived data (such as maps in PDF and KML formats) prior to its delivery to NTIA as part of DSCI's BP feedback process and for verification tasks

Data Flow
Broadband Mapping Project
Version 2



Notes: EFT/HTTPS server can only be accessed by a unique username and password. "Accounts" remain active during pending intake and feedback transfer. Server autobans any IP/user after three failed attempts.

Validation

Validation Overview

Collaborative Verification Process and Feedback Loop

Below is an outline of our Collaborative Verification Process and the checklist of review steps and topics covered in each session. Some 16 separate collaborative verification sessions were held utilizing GoToMeeting during the review of the Spring 2013 data for this submittal cycle.

- Processing Overview
    - Discuss any notifications or pending issues for data processing and verification
- Provider by Provider
    - Overview of Evaluation of Submitted Files
        - Review the QA spreadsheet and embedded notes
        - Note anything odd/unexplained about the processing
    - Statistical Comparison of Current vs. Previous Submittal
        - Number of Features by Tech Category.
        - Area or length of Features.
        - Compare number of Middle Mile points
    - Interactive Review
        - Look at and evaluate Tech and Speeds
        - Visual overlay of previous submittal with this one
            - Use Symmetrical Difference Layer to zoom to areas when needed
        - Note any significant differences or anomalies
    - Comparison with Verification Sources.
        - Look at Middle Mile points, if available
        - Look at American Roamer, Cable Boundaries/Media Maps, TeleAtlas, etc.
        - Look at Federal Crowdsource points and in/near/out statistics
        - Look at IDInsight points (optionally)
    - Zoom/Pan
        - Look at edges, especially and use previous overlay
    - Take snapshots, as needed for Provider feedback and verification
    - Capture Notes for Feedback Package and wiki.
    - Schedule any Provider interactive sessions and next DSCI interactive sessions
    - Review FTP site vs. what has been copied down locally
        - Do we have what we think we have?
    - Review workflow spreadsheet and update for steps complete and still pending for each BPs' data set

Validation Data Sources

FCC Form 477 Data: The FCC requires all facilities-based providers to submit a Form 477 data, which is then used to produce Local Telephone Competition and Broadband Data for analysis and reporting. The associated FCC Registration Number (FRN) is a key data identification and indexing element and the underlying data, though significantly limited in the desired broadband accuracy and granularity, has proved useful for identifying relevant Broadband Providers and as a starting point for some reverse mapping activities.

American Roamer: DSCI licenses American Roamer data for Arizona from Esri, which provides a substantial view of wireless voice and advanced services coverage patterns. The data set has proven of substantial use in cross checking mobile Broadband Providers' declared coverage and gaps. With the dynamic nature of the mobile industry and advancing 3G and 4G deployments, American Roamer data will be licensed on an ongoing basis to support DSCI verification activities.

Cable Boundaries/Media Maps: DSCI licenses Cable Boundaries data from Esri for Arizona for use as a primary verification source for cable wireline providers. It is based on information from MediaPrints developed by Direct Group and Warren Communications and updated quarterly. Cable Boundaries data provides current information about cable services by area and has data variables including primary ownership, subscribers, miles of plant, and digital capability. The data are available in a variety of geographies. Though initially useful in verification for comparing declared cable broadband coverage, it generally has proved to grossly overestimate the BPs broadband service territory and is a coarse tool of limited utility.

TeleAtlas Central Offices & Wire Centers: DSCI licenses TeleAtlas Central Offices & Wire Centers from Esri for ILEC and CLEC base facilities identification. Such data is available from a variety of sources and tends to remain relatively constant over time. Also, since it doesn't capture Digital Subscriber Line Access Multiplexer (DSLAM) locations, it must be complemented by other means to be useful in verifying wireline LEC coverage and gaps.

Wireless Applications, Corp. SiteSync: PowerSearch manages queries to multiple databases including FCC, FAA, licensed microwave, and tower companies to look for structures or towers placed in designated areas and often reveals the specific broadband providers collocating on those towers. eCoverage projects signal propagation and terrain coverage using high-resolution terrain data and Longley-Rice frequency calculations through an easy to use downlink coverage and contour generator with easily adjustable parameters like antenna, azimuth height, frequency, and power.

Federal Crowdsourced Data: The FCC offers an online Consumer Broadband Test (http://www.broadband.gov/qualitytest/about/) to give consumers additional information about the quality of their broadband connections and to create awareness about the importance of broadband quality in accessing content and services over the internet. The FCC complements the data collected from the Consumer Broadband Test with the submitted street address and other data, aggregating it to several monthly files grouped by State and available for secured

download. DSCI processes the wireline and wireless results files, converting IP addresses to named Broadband Providers, and otherwise prepares the data for use in collaborative verification procedures. These data sets have proved extremely useful in confirming declared and/or estimated BP coverage and speeds, leading to detection of core data anomalies and issues that have largely been corrected with BP participation, thus yielding much more accurate and reliable data submittals. Note that a new State speed test has launched and Mobile Pulse contracted with for specialty mobile wireless speed testing going forward per details below in the Arizona Broadband Policy Initiatives section. It is anticipated the complementary speed testing results in greater abundance will greatly enhance verification veracity and policy analysis capabilities.

ID Insight Crowdsourced Data: DSCI previously licensed the BroadBand Scout database from ID Insight for all 15 Arizona counties. ID Insight uses proprietary analytic modeling, demographic data, and retail Internet order data that include physical and IP addresses, to detail consumer access types and transmission speeds keyed to geographic locations which contribute to our verification views of BP footprints and coverage gaps. To date, this data source has proved complementary to the FCC crowdsourced data and only contributed incremental knowledge and detection of data set anomalies in a limited number of cases. However, detailed review of IP addresses and BPs has led to the identification of several additional relevant BPs that have since been successfully engaged by DSCI. The legacy data set is only occasionally referenced in current verification processes, especially when good density federal speed test data is unavailable.

Arizona Broadband Map

Arizona Broadband Map Overview

The Arizona Broadband Map features two interfaces, one for the general public and another for community planners or more advanced users. Both versions of the map allow substantial flexibility and usability in navigating to, framing, selecting data, and customizing views.

The Arizona Broadband Map (Basic) is a public map at http://broadbandmap.az.gov/map/ that provides a detailed and multi-layered map showing the availability and advertised performance of High Capacity Digital Services (Broadband) in the State of Arizona by individual street address or at any point selected. Links are provided to many providers websites when the provider is identified as one of those serving an address or location.

The Community Broadband Planning Map at http://broadbandmap.az.gov/CommunityPlanningMap/ includes a large collection of map layers with a rich set of Spatial Analysis Tools to help community planners make better broadband decisions for their community. The powerful application has Population and Housing data down to the Census Block level. Community broadband consultants have also prepared profile spreadsheets for each Arizona community which are linked from the map and downloadable.

Both the Basic and Community Broadband Planning mapping applications use ArcGIS Server Technology from Esri, and are accessible by anyone with an Internet connection.

Arizona Broadband Map Details

The Community Broadband Planning Map was designed to help Community Planners make better broadband decisions for their community and other advanced users optimize and exploit the available data. The central idea behind this added map version was to present a set of tools that would help a planner identify their study area, find all combinations of Broadband Providers, Service Types and Advertised Download/Upload speeds, and quickly chart out the Population and Housing data showing the number of people, average median age, households, average household size, total area, etc.

What makes Arizona's Community Planning Map unique is the power and flexibility it gives users to perform spatial analysis. For example, users can perform a spatial search to find all the Libraries within a specific Zipcode. Subsequently, a 2-mile buffer can be drawn around a Library to find all the public schools that fall within this 2-mile radius. The Advertised Upload and Download Broadband Speeds and Service Types to these schools can be instantly charted. Further, all the Census Blocks falling within this 2-mile buffer can be selected and their attributes can be exported to a spreadsheet. Users can easily determine the number of people living within 2 miles of a Library; find their average median age, the total number of households, etc.

All of Arizona's Broadband Providers and their associated metrics can be easily viewed and the results saved as a Comma or Tab Delimited File for further analysis. A Community Planner can readily measure the area and perimeter of their community; find the distance from the nearest Central Office, or major road or highway; and quickly view the Broadband footprints of every provider in the vicinity. Spatial Searches can be made based on a Census Block, Census Block Group, Census Tract, Zipcode, City or Town, or any arbitrary polygon drawn on the map.

Once a search area is defined, users can easily locate Community Anchor Institutions (CAIs) including Schools, Libraries, Hospitals, Fire Stations, Police Departments, etc., falling within this area and draw buffers around selected features, to continue the spatial search process and preparation of map views with great utility.

Arizona Broadband Map Tutorials

Twenty-three tutorials on how to use various features of the map are available on a dedicated YouTube channel at http://www.youtube.com/user/ArizonaBroadband. In addition to providing instructions on how to use the map they demonstrate functions such as:

- Finding an Address,
- Identifying Broadband Providers,
- Displaying the Map Layers,
- Identifying Community Buildings,
- Buffering Points,

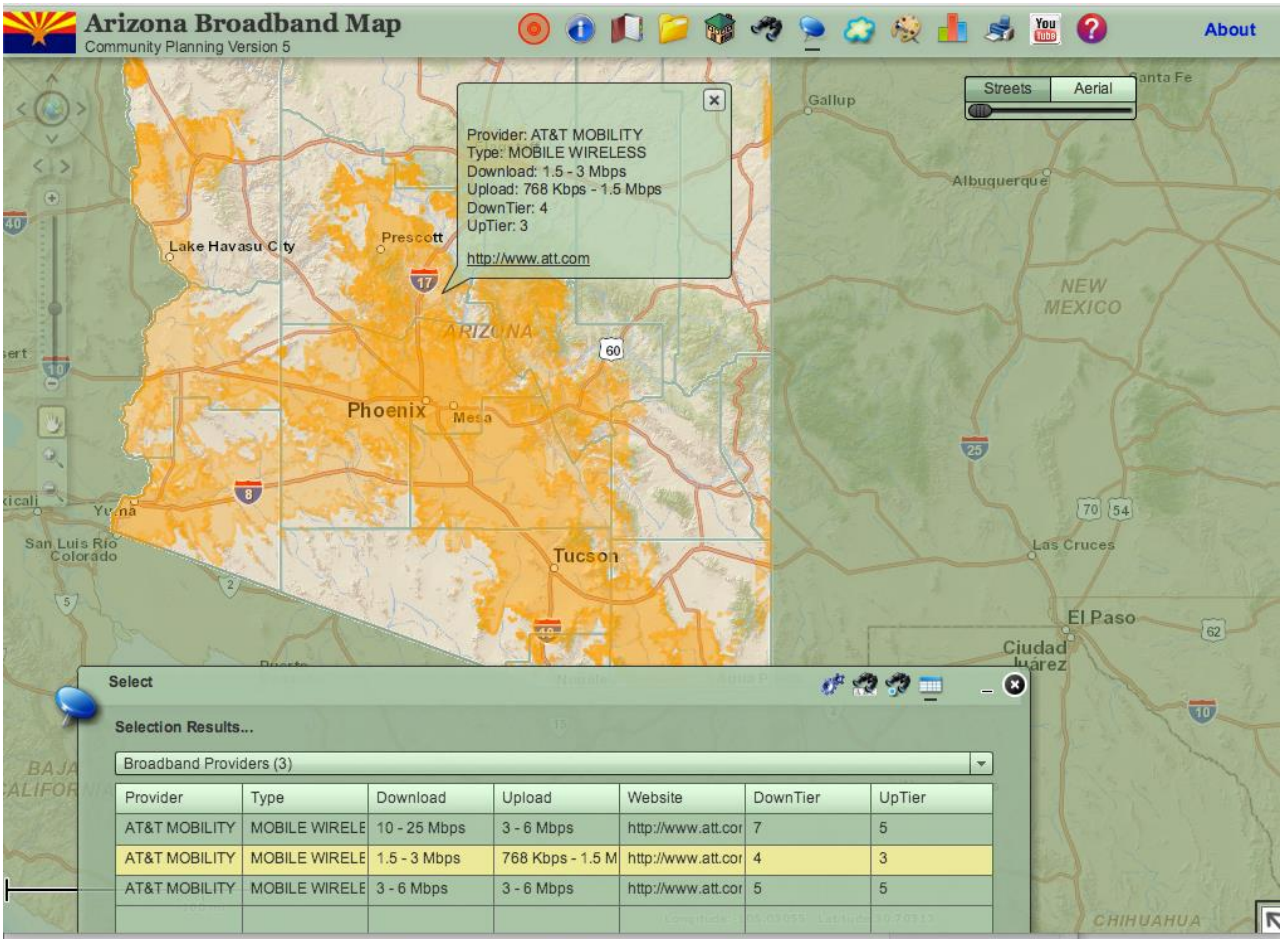
- Graphical Search,
- Text Search,
- Spatial Search and
- Using the Select Widget.

Some of the latest features added include the capability to build an SQL statement to display the Broadband Footprints of a specific Provider. For example, one can:

- Display the Broadband Footprints of a selected BP such as AT&T Mobility, showing all their speed tiers;
- Further modify the SQL Statement to display only Download Speed Tier = 7, which helps to display just the 4G coverage areas of AT&T Mobility;
- Save your SQL Statements to Notepad for later use;
- Build similar SQL Statements to display the 4G coverage areas of some other carrier, such as Verizon; and
- Display the combined 4G coverage areas of AT&T and Verizon.

We believe we are unique among the 50 States to have this mapping capability to isolate and display Broadband Coverage areas by a given BP and a given Speed Tier.

The screen shot below shows one of the earlier stages of the above example process.



Arizona Broadband Policy Initiatives

We have been engaged as partners in various Arizona broadband grant related initiatives, some of which are described below:

The State of Arizona, through the Arizona Strategic Enterprise Technology Office (ASET - http://aset.azdoa.gov/), continues to define and develop an array of broadband policy and planning initiatives including a Digital Arizona Council (DAC) comprised of government, institutional, and private sector participants. The ASET team has involved many in the broadband provider community in discussing Arizona broadband deployment issues and working towards creative and effective solutions. There are six established DAC Task Forces. The DAC Strategic Planning Task Force developed a draft Arizona Broadband Strategic Plan that can be found in three versions of varying length at http://www.digitalarizona.gov/Digital_Arizona_Council/Strategy.html.

ASET has continued to evolve the Arizona Broadband Project Portal also hosting the Digital Arizona Project content and resources at http://www.digitalarizona.gov/ as a home base for DAC and this project as well as other broadband initiatives.

In March 2013, ASET launched an Arizona broadband speed test and associated campaign designed to gather critical broadband metrics and serve the public. Arizona licensed the core speed test capabilities from Ookla and created a portal for end users to test their connections, answer some mandatory questions, and optionally answer additional survey questions. The speed test and associated survey is being used by the Arizona State Lottery system to obtain actual performance numbers from users who access the Lottery website. One of our partners, the non-profit Arizona Telecommunications and Information Council (ATIC) at http://arizonatele.com/, has donated several iPads as prizes randomly awarded among those who take the speed test and the survey. The Arizona Department of Education (ADE) is also soliciting participation from all Arizona teachers and staff personnel as are the community broadband consultants and other partners.

In order to enhance the breadth of sources available for gathering speed test data, ASET has contracted with Mobile Pulse, Inc. (http://www.mobilepulse.com/), who provides tools for mobile broadband measurement and analytics. The Mobile Pulse app is installed on mobile devices to periodically collect network performance data in the background and securely sends it to Mobile Pulse. Gathered data is analyzed and clearly presented on a web-based dashboard featuring detailed maps, comparisons and reports, as well as being made available for download for post processing and analysis.

The Arizona State Land Department (ASLD) is maintaining the related Arizona Broadband Map at http://broadbandmap.az.gov/map/ loaded with the last broadband data set. Additionally, there is a special Community Planning version of the broadband map available at http://broadbandmap.az.gov/CommunityPlanningMap/ and loaded with demographic data and special analysis tools that will aid community broadband analysis and planning. These tools are designed to mutually serve both Arizona's broadband consumer and provider communities, as

well as contribute to State policy and strategic planning. It should help lead consumers to provider web sites and information about their broadband offerings, hopefully becoming an important tool in the BPs' marketing efforts.

Arizona's rural communities are now receiving Community Broadband Planning and Technical Assistance help. ASET and its non-profit partner, the Arizona Telecommunications & Information Institute (ATI Institute - http://aztii.org/), have qualified and approved a cadre of consultants who have been selected by regional government coalitions to provide strategic planning, technical assistance, and grant writing, e-commerce training and assistance across Arizona's rural areas.

An Essential Infrastructure for Information Delivery study was performed by DSCI in the fall of 2011 and produced an Arizona roadmap for reducing barriers based in arizona law, policy, and rules hindering establishing public rights-of-way as essential infrastructure for information delivery. Herein, we identify the many Right-of-Way (ROW) issues encountered by government, industry, and broadband customers, both commercial and residential and offer up insight on current trends, national policy evolution, and the State of Arizona's opportunities to undertake positive actions where appropriate and practical.

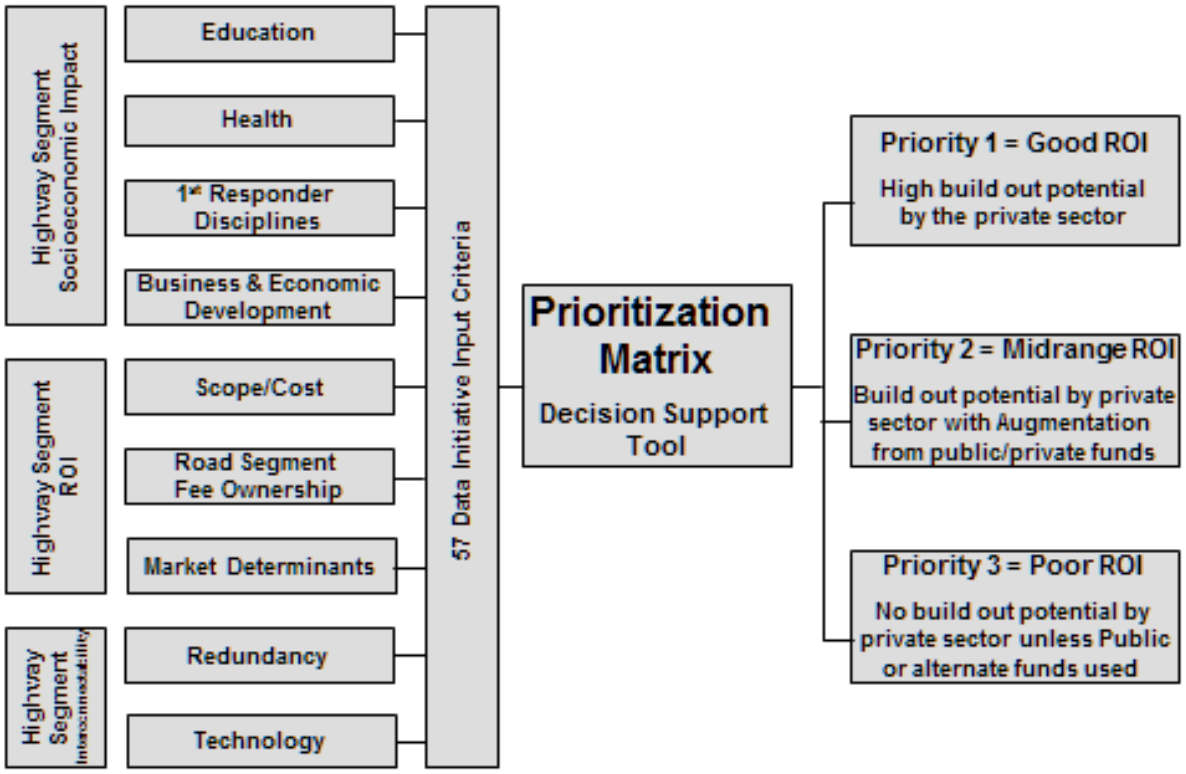
The Essential Infrastructure for Information Delivery study seeded the opportunity for ATIC to develop and drive new legislation, Arizona SB1402, the Digital Arizona Highways Bill, which was passed and signed in the 2012 legislative session. Specifically, the bill expands existing rules governing ADOT's management of State ROW to include transportation-of-information as well as vehicles and to make available conduits in the ROW to private broadband providers on a cost-recovery basis. The result will be more utilization and streamlined access to the ROW for constructing broadband conduits, thereby accelerating and improving availability of broadband services to unserved areas of Arizona. ASET and ADOT are working together to launch one or more demonstration projects deploying fiber conduit along state highways in cooperation with providers to provide critical middle mile digital capacity for mobile wireless backhaul, community fixed wireless delivery, and support of other connectivity needs.

Because of the passing of SB1402 ASET's SBDD program is working closely with our Public Safety Interoperable Communications (PISC) Office which has responsibility for FirstNet planning and outreach. This office also reports to the state CIO and is exploring synergistic ways of using SB1402 to potentially lower the costs of expanding rural backhaul infrastructure for use by FirstNet and also sharing those expanded resources to benefit educational, healthcare, and economic development uses in rural communities.

ASET has developed a Highway Conduit Deployment Prioritization Matrix to support the evaluation and prioritization of the Digital Arizona Program (DAP) Proof-of-Concept demonstrations and support statewide conduit buildout staging and sequencing processes. The Prioritization Matrix tool assists the decision making process by analyzing some 90+ individual road segments rather than individual communities as the basis for evaluation. It supplies empirical (data driven) analysis rather than subjective evaluation methods incorporating some

59 prioritization matrix data variables. The Prioritization Matrix supports a Management by Objective (MBO) framework oriented around three high level objectives:

- Highway segment socioeconomic impact (Educ., Health, Public Safety, Econ. Dev. [cell towers, application readiness])
- Highway segment ROI (Scope/Cost [terrain], Ownership, Market Determinants [population, demand, current infrastructure])
- Highway segment interconnectability (Technology [carrier hotels along segment], SONET Ring viability and redundancy [does it further an interconnect])

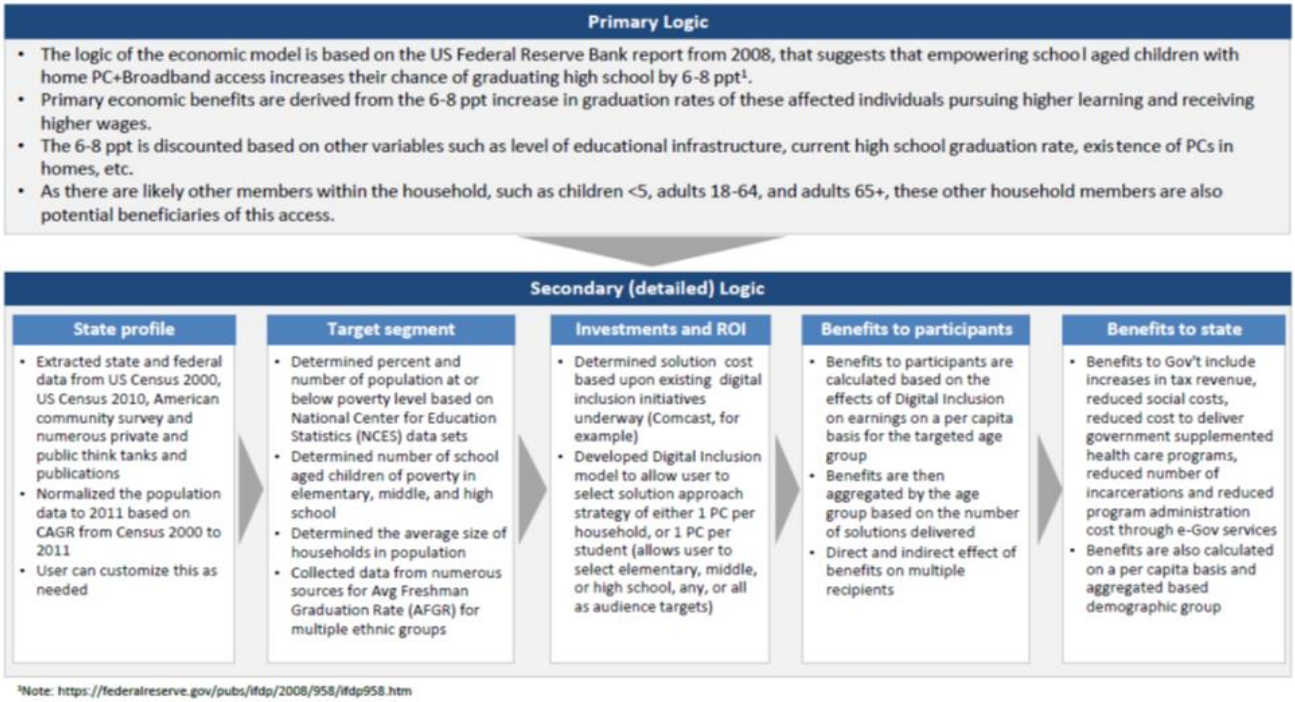


ASET and DSCI have several interns working at ADOT to review land ownership and use along State highways as divided into a number of road segments and capture relevant data and associated documents.

Another significant piece of legislation related to broadband in rural areas, SB1353, the telemedicine parity bill, was promoted by our partner ATIC and was signed into law by the Governor in 2013. It requires private health insurers to provide coverage in rural communities for services delivered via telemedicine at a comparable rate to those provided in person. Services covered include trauma, burns, cardiology, infectious diseases, mental health disorders, neurological diseases and dermatology. Significant collaboration between healthcare stakeholders and telemedicine interests built a coalition and solid support for the bill.

ATI Institute partnered with Microsoft Corporation (http://www.microsoft.com/) and their Shape the Future team to have a Digital Inclusion Economic Impact Model for Arizona executed by their partner The Arnold Group (http://www.the-arnold-group.com/) at no cost to ATI Institute or the State. The model is designed to measure the economic impact of digital inclusion initiatives

and has been performed across the U.S. in five states and seven cities to date including Arizona. Now that the statewide study is complete, the tool as provided to ATI Institute can be freely used with local communities by government, consultants, and the communities themselves, so they too can begin to understand the benefits of digital inclusion at a local level.



ASET and ASLD are committed to using the NTIA grant to realize significant insights to the Arizona broadband environment and provide real benefits to broadband providers in identifying unserved and underserved markets, easing regulation and right of way issues, and otherwise contributing to robust broadband availability and favorable broadband provider environment.

Appendix A - Arizona Broadband Provider Changes and Corrections Document

Arizona Spring 2013 (Submission 7)

Arizona Broadband Providers (BPs)	Changes	Corrections	Spring 2013 (Submission 7) Changes and Corrections Notes
Airband			No changes for this provider this cycle.
Airebeam			No changes for this provider this cycle.
AT&T Mobility LLC	X		Shows almost 10,000 square miles of increased coverage for 3G spectrum. 4G looks logical, shows some growth.
AZNet			No changes for this provider this cycle.
Baja Broadband			No changes for this provider this cycle.
BeamSpeed			No changes for this provider this cycle; provider has been non-responsive.
Bolt Internet			No changes for this provider this cycle.
Cable One	X		Cable one appears to have made a greater effort to be accurate; we show less road segments, but a greater coverage area through census blocks. They also carry no Tech 41.
Casa Grande Internet			No changes for this provider this cycle.
(Cellular One)			This provider does not supply up or downstream speeds fast enough to be broadband.
CenturyLink	X		First FTTH availability and overall growth in this submittal. Show less road segments, but more coverage area; again we believe this to be an effort at accuracy.
CIS Wireless Broadband			No changes for this provider this cycle.
City of Phoenix (Sky Harbor Airport)			No changes for this provider this cycle.
Comcast Cable	X		Comcast increased number of census blocks, but their area of coverage went down. Road segments are up. We note many drops along the ten in Tucson.
Commspeed			No changes for this provider this cycle. (now owns Swift Wireless)
Copper Valley			No changes for this provider this cycle.
CopperNet			No changes for this provider this cycle.
Covad Communications	X		Note reductions in Tech 10 and 20; roughly 50 to 70 square miles for each, and lost minimal ground on tech 30.

Arizona Broadband Providers (BPs)	Changes	Corrections	Spring 2013 (Submission 7) Changes and Corrections Notes
Cox Communications	X	X	Cox sent us a shapefile for the first time, which encompassed address and census block service areas. We combined the shapefile, census blocks, and Road segments; shows contraction, and loss of Gila Bend, Willcox, Pearce and Patagonia.
DataMax Wireless/Wecom			No changes for this provider this cycle.
Desert iNet			No changes for this provider this cycle.
Fort Mojave Telecom			No changes for this provider this cycle.
Frontier Citizens Utilities Rural	X		About 25% increase in area that seem to be strategic expansion.
Frontier Communications of the Southwest	X		Approximately 10-fold increase in area due to acquisition of Verizon of California area.
Frontier Communications of the White Mountains	X		Minimal changes in area.
Frontier Navajo Communications	X		Minimal changes in area. The DSLAMS in this submittal only showed a 15K radius and not the concentric circles of other DSLAMS in the frontier network. Additional coverage in Chinle.
(Gila River Telecom)			Continue to opt out for this cycle.
Golden Valley			No changes for this provider this cycle.
Grand Avenue Broadband			No changes for this provider this cycle; adamant about not participating in the project.
Greenfield Communications			No changes for this provider this cycle.
HNS (Hughes, EchoStar)	X		The actual coverage HNS sent us this time as a text file of census blocks. This census block layer was dissolved into service area polygon and is dramatically different from previous submittals. Does not cover the whole state, but does offer two different speeds.
Hopi Telecom (HTI)			No changes for this provider this cycle.
HPAZ.net	X		New Provider; reverse mapped through website information.
InfoWest			No changes for this provider this cycle.
Integra Telecom (Echelon)			No changes for this provider this cycle.
Last Mile Research	X		Changed from a single point of presence to WISP services over Tusayan and changed from Tech 30 to Tech 70.
Leap Wireless (Cricket)	X		Increases in area of over a thousand sq. miles, despite the loss of a spectrum assumed added to other spectrum.

Arizona Broadband Providers (BPs)	Changes	Corrections	Spring 2013 (Submission 7) Changes and Corrections Notes
Level 3 Communications	X		Increased in area from 7.4 to 26.3 sq. miles, and 64 to 278 Census Blocks. However the middle mile point change from 188 to 68, we assume this is a complete submittal.
Mediacom Southeast			No changes for this provider this cycle.
Orbitel Communications			No changes for this provider this cycle; provider has come under new ownership, Shurz Communications.
Phoenix Internet			No changes for this provider this cycle.
Pointe Wireless			No changes for this provider this cycle.
Rio Verde Wireless			No changes for this provider this cycle.
Rio Virgin Telephone (Reliance Connects)			No changes for this provider this cycle.
RuralNet Wireless			No changes for this provider this cycle.
Saddleback Communications			No changes for this provider this cycle.
Salt River Project (SRP)	X		Greatly reduced coverage from them due to clarifications in representing fiber coverage from the NTIA. SRP omitted service in eastern mining district for this submittal.
San Carlos Apache Telecom Utility (SCATUI)			No changes for this provider this cycle; no lit fiber for outside consumption.
Simply Bits			No changes for this provider this cycle.
SkyCasters			No changes for this provider this cycle.
Smith Bagley, Inc.			No changes for this provider this cycle.
South Central Utah Telephone Association			No changes for this provider this cycle; provider has been non-responsive.
Sprint Communications	X		Increased coverage area of 28 sq. Miles.
StarBand Communications			No changes for this provider this cycle.
SuddenLink	X		Show some logical additions and subtractions. Found nothing major, but did take Screenshots for reference to provider for confirmation.
Table Top Telephone			No changes for this provider this cycle.
TDS Telecom	X		Only has 3 middle mile points.
Time Warner Cable	X		Minor increase of ten census blocks.
T-Mobile (Deutsche Telekom)	X		Shows growth in 4G inTucson and Flagstaff; however the typical listed speeds for 3G are too slow to classify as broadband.
Tohono O'odham Utility (TOUA)			No changes for this provider this cycle.
Transcend Broadband			No changes for this provider this cycle.
Transworld Network	X		Re-modeled the service area and combined with Fall 2012 coverage.
Trucom (BlueWire)			No changes for this provider this cycle.

Arizona Broadband Providers (BPs)	Changes	Corrections	Spring 2013 (Submission 7) Changes and Corrections Notes
TW Telecom	X		Minor decrease for Tech 30 and minor increase for Tech50.
Valley Connections			No changes for this provider this cycle.
Valley Telephone Coop			No changes for this provider this cycle.
Verizon Wireless	X		We see little or no change in 3G coverage, but new 4G coverage in Tucson, Flagstaff, Prescott, Casa Grande, and Blythe.
ViaSat	X		Minor increase in download speed. Looks logical.
WebHiway Communications			No changes for this provider this cycle.
Western Broadband			No changes for this provider this cycle; provider has been non-responsive. Purchased by Shurz
(Western WiMax)			Continue to opt out.
Wydebeam			No changes for this provider this cycle.
XO Communications			No changes for this provider this cycle.
Xpressweb Internet			No changes for this provider this cycle.
Ygnition			No changes for this provider this cycle.
Zayo Enterprise Networks	X		Received updated information.
Zona			No changes for this provider this cycle; provider has been non-responsive.
Total Included	**17**	**1**	

Note: Parenthesis indicates a provider not included in this submittal.

Appendix B - Arizona Broadband Coverage Maps for Spring 2013

All Technologies (except Satellite)
DSL, xDSL & Other Copper (Tech 10-30)
Cable Modem (Tech 40-41)
Optical Carrier/Fiber to End User (Tech 50)
Satellite (Tech 60)
Fixed Wireless (Tech 70-71)
Mobile Wireless (Tech 80)
Middle Mile Providers
Broadband Provider Count

Arizona Digital Landscape and Situational Analysis

From the Arizona Broadband Analysis Project data for Spring 2013 we know that while a healthy 99.5% of Arizona households can get broadband of at least 768 Kbps download from at least one provider, not including available satellite service. As we move to rural areas that decreases to 97.6% of households. And for sparsely populated rural areas, the percentage decreases further to 95.7% of households, leaving more than 4% of sparsely populated rural households without any broadband coverage at all except satellite.

When we consider the more reasonable modern connection speed of at least 3 Mbps download, the availability percentages start to visibly decline to 97.5% of households statewide, 88.3% for rural areas, and 80.9% for sparsely populated rural areas leaving some 19% of households in sparsely populated rural areas without what we would consider adequate bandwidth. At a somewhat higher connection speed of 6 Mbps download, the availability percentages more precipitously decline to 95.2% of households statewide, 77.8% for rural areas, and only 65.9% for sparsely populated rural areas leaving some 34% of households in sparsely populated rural areas without such higher performance services.

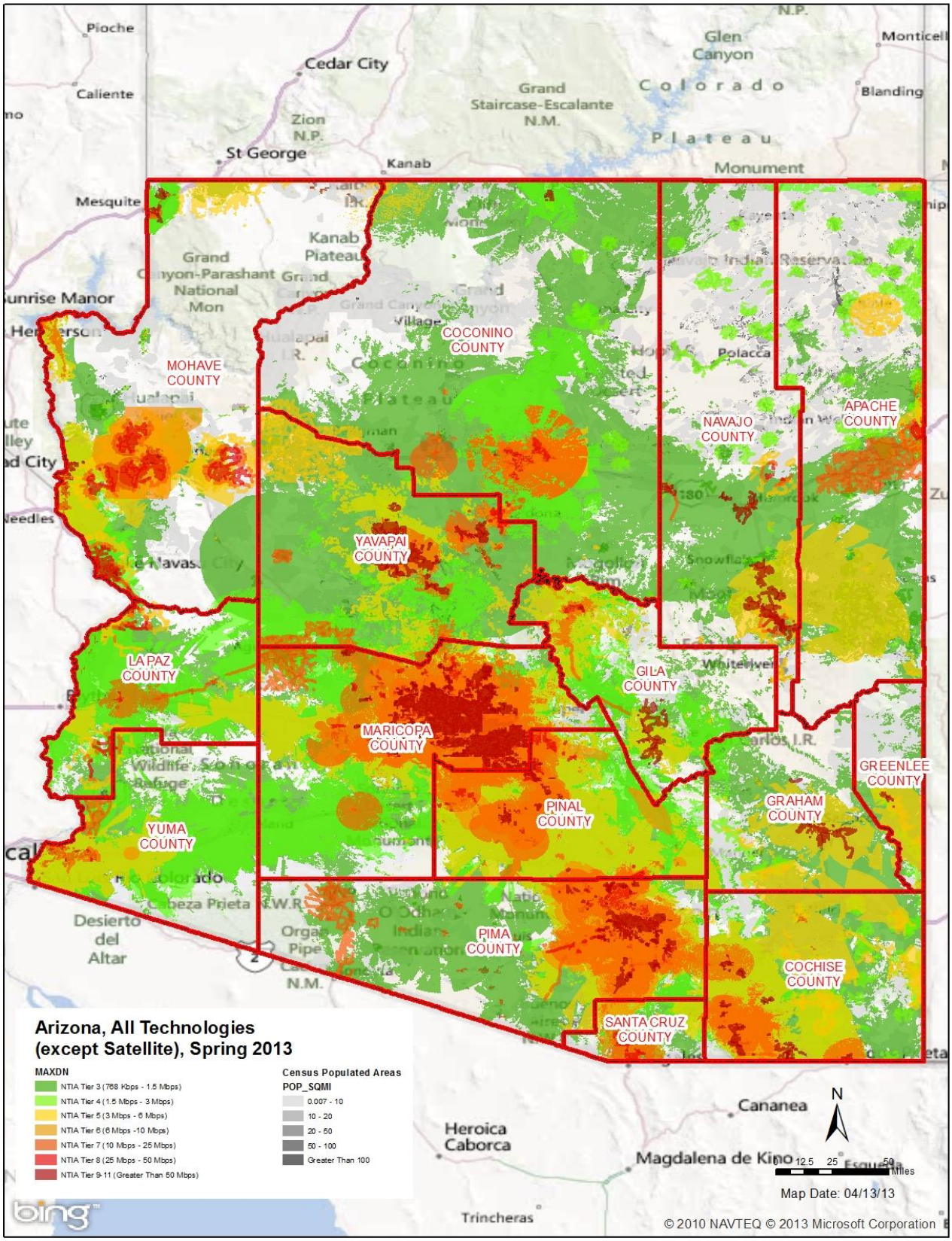
Looking at specific technologies, DSL, xDSL & other copper delivered services at connection speeds of at least 3 Mbps download are available to 86.4% of households statewide, 55.2% for rural areas, and 42.9% for sparsely populated rural areas. At a somewhat higher connection speed of 6 Mbps download, the availability percentages more precipitously decline to 78.4% of households statewide, 41.0% for rural areas, and only 30.8% for sparsely populated rural areas.

Cable modem services at connection speeds of at least 3 Mbps download are available to 88.9% of households statewide, 55.9% for rural areas, and 34.3% for sparsely populated rural areas. The cable industry has invested heavily in a new generation of DOCSIS 3.0 services to be able to deliver connection speeds of 10 Mbps download or greater to 88.6% of households statewide, but that percentage declines to 55.5% of rural households and only 33.8% of sparsely populated rural households.

Fixed wireless services at connection speeds of at least 768 Kbps download, including Wi-Fi networks and other fixed wireless technologies, are available to 94.7% of individuals statewide, 76.1% for rural areas, and 68.3% for sparsely populated rural areas. At connection speeds of at least 3.0 Mbps, fixed wireless services are available to only 62.0% of individuals statewide, but only to 63.1% of those living in rural areas and 53.2% of those in sparsely populated rural areas.

Mobile wireless services at connection speeds of at least 768 Kbps download, generally 3G services edging into 4G, are available to 98.7% of individuals statewide, 93.7% for rural areas, and 90.2% for sparsely populated rural areas. At connection speeds of at least 3.0 Mbps, well into 4G service range, mobile wireless services have rapidly expanded and are now available to 92.8% of individuals statewide, but only to 68.0% of those living in rural areas and 61.0% of those in sparsely populated rural areas.

Satellite broadband services at connection speeds of at least 1.5 Mbps download are available to all individuals statewide with a view of the southern sky and ability to mount a small satellite dish. Connection speeds of up to 10 Mbps and beyond are available selectively within defined geographic footprints.


Arizona, All Technologies
(except Satellite), Spring 2013
MAXDN
NTIA Tier 3 (768 Kbps - 1.5 Mbps)
NTIA Tier 4 (1.5 Mbps - 3 Mbps)
NTIA Tier 5 (3 Mbps - 6 Mbps)
NTIA Tier 6 (6 Mbps -10 Mbps)
NTIA Tier 7 (10 Mbps - 25 Mbps)
NTIA Tier 8 (25 Mbps - 50 Mbps)
NTIA Tier 9-11 (Greater Than 50 Mbps)
Census Populated Areas
POP_SQMI
0.007 - 10
10 - 20
20 - 50
50 - 100
Greater Than 100
MOHAVE COUNTY
COCONINO COUNTY
NAVAJO COUNTY
APACHE COUNTY
YAVAPAI COUNTY
LA PAZ COUNTY
GILA COUNTY
MARICOPA COUNTY
GREENLEE COUNTY
GRAHAM COUNTY
PINAL COUNTY
YUMA COUNTY
PIMA COUNTY
COCHISE COUNTY
SANTA CRUZ COUNTY
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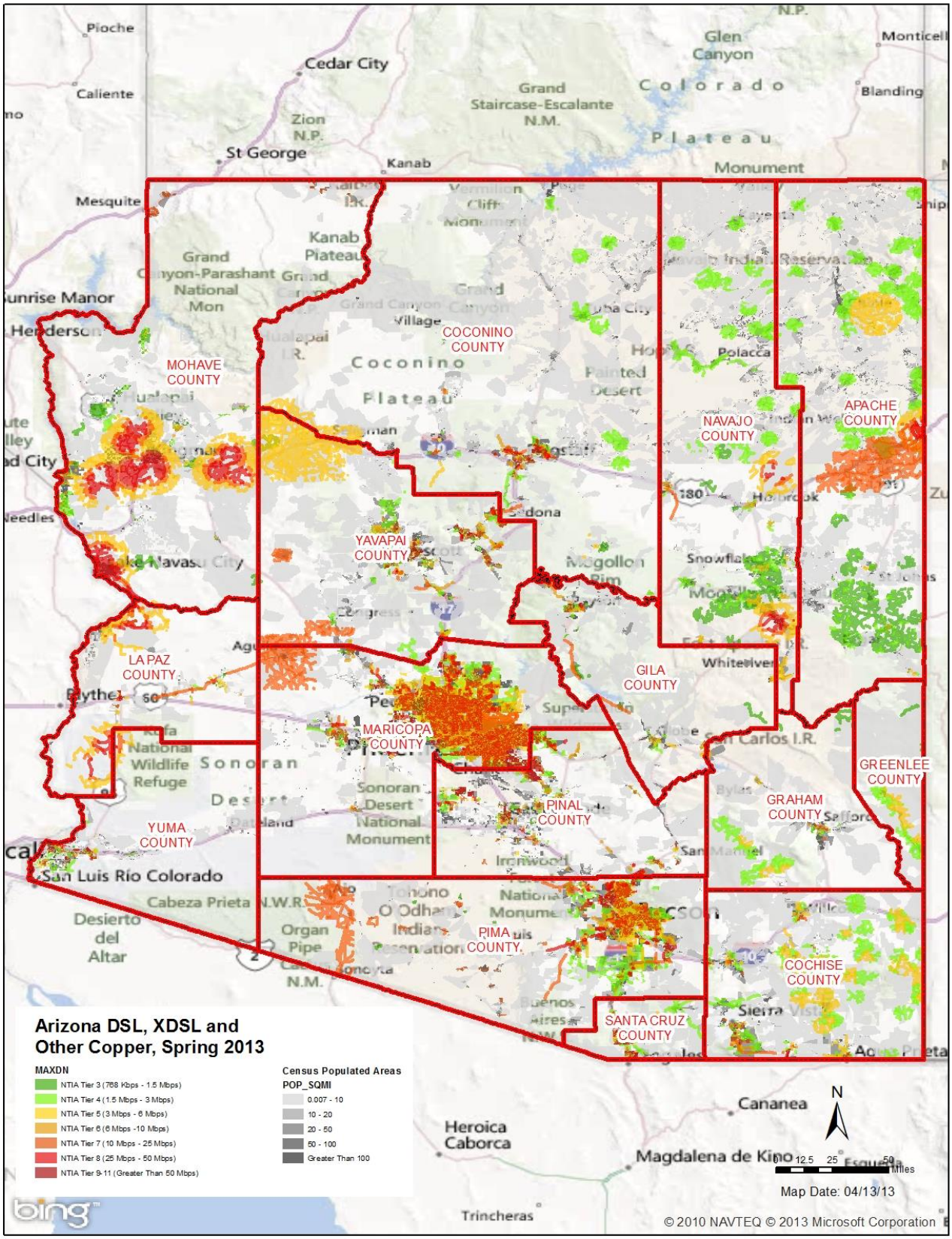
Arizona DSL, XDSL and Other Copper, Spring 2013
MAXDN
NTIA Tier 3 (768 Kbps - 1.5 Mbps)
NTIA Tier 4 (1.5 Mbps - 3 Mbps)
NTIA Tier 5 (3 Mbps - 6 Mbps)
NTIA Tier 6 (6 Mbps -10 Mbps)
NTIA Tier 7 (10 Mbps - 25 Mbps)
NTIA Tier 8 (25 Mbps - 50 Mbps)
NTIA Tier 9-11 (Greater Than 50 Mbps)
Census Populated Areas
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0.007 - 10
10 - 20
20 - 50
50 - 100
Greater Than 100
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MOHAVE COUNTY
YAVAPAI COUNTY
NAVAJO COUNTY
APACHE COUNTY
GILA COUNTY
LA PAZ COUNTY
MARICOPA COUNTY
PINAL COUNTY
GREENLEE COUNTY
GRAHAM COUNTY
YUMA COUNTY
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COCHISE COUNTY
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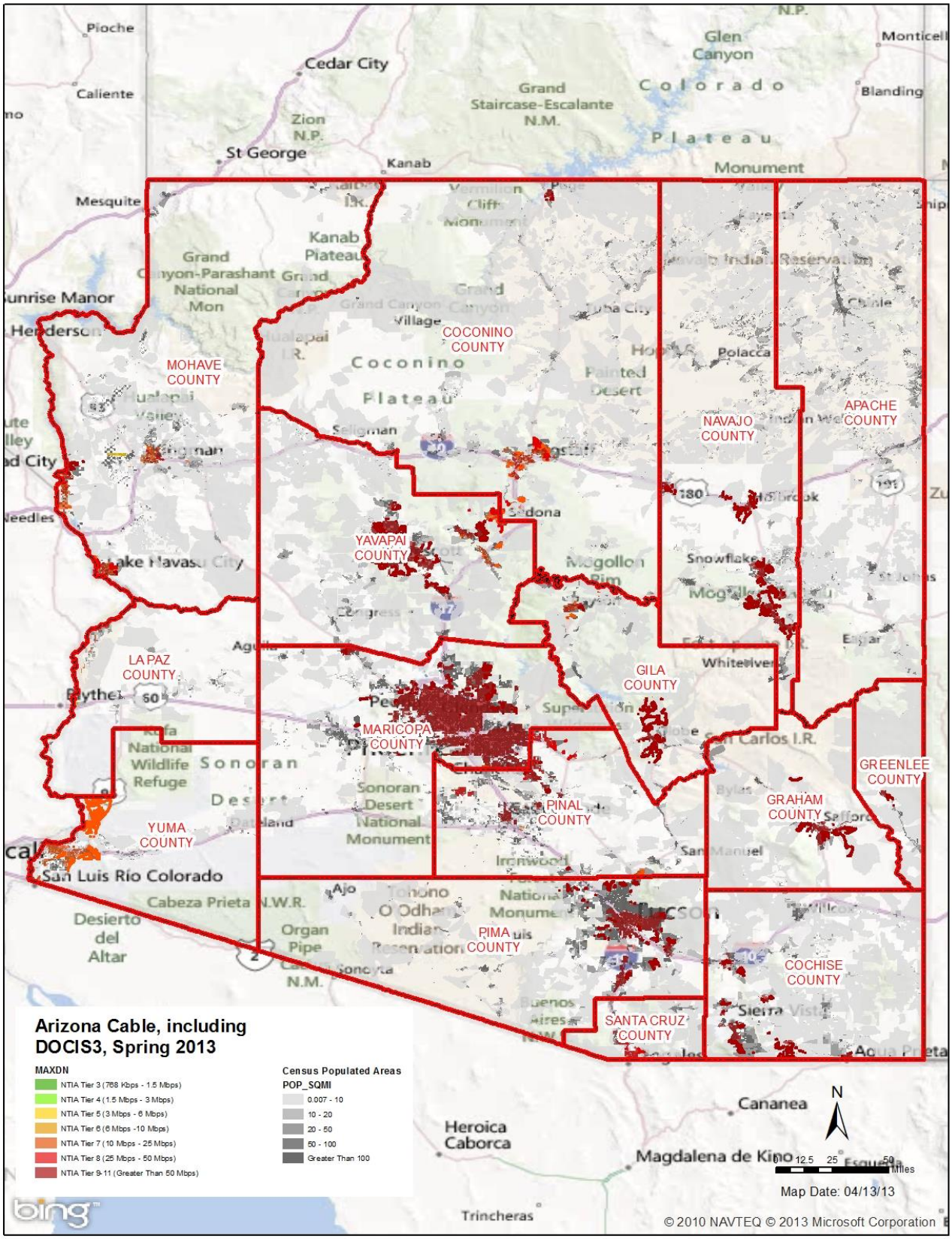
Arizona Cable, including DOCIS3, Spring 2013
MAXDN
NTIA Tier 3 (768 Kbps - 1.5 Mbps)
NTIA Tier 4 (1.5 Mbps - 3 Mbps)
NTIA Tier 5 (3 Mbps - 6 Mbps)
NTIA Tier 6 (6 Mbps -10 Mbps)
NTIA Tier 7 (10 Mbps - 25 Mbps)
NTIA Tier 8 (25 Mbps - 50 Mbps)
NTIA Tier 9-11 (Greater Than 50 Mbps)
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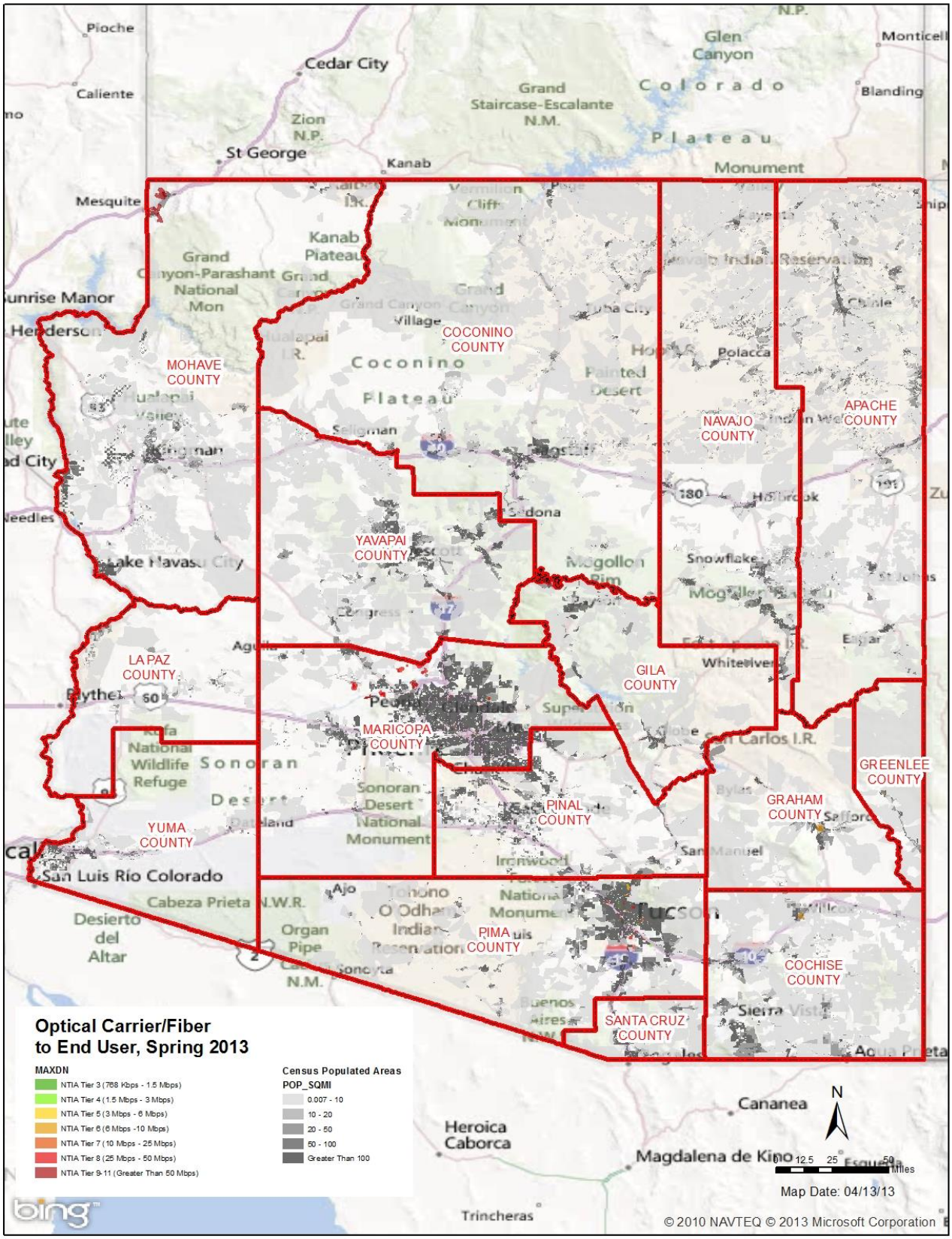
Optical Carrier/Fiber
to End User, Spring 2013
MAXDN
NTIA Tier 3 (768 Kbps - 1.5 Mbps)
NTIA Tier 4 (1.5 Mbps - 3 Mbps)
NTIA Tier 5 (3 Mbps - 6 Mbps)
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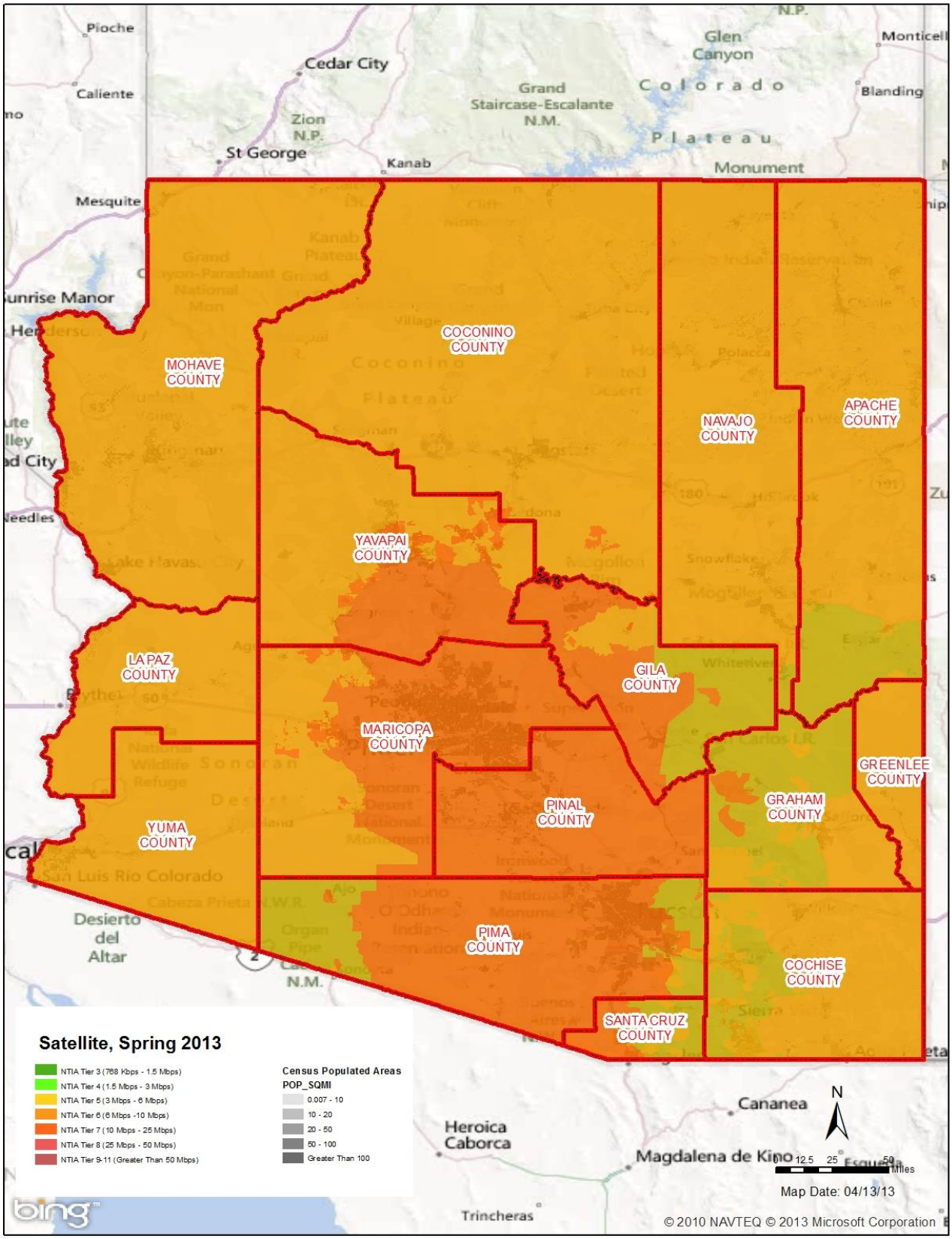
Satellite, Spring 2013
NTIA Tier 3 (768 Kbps - 1.5 Mbps)
NTIA Tier 4 (1.5 Mbps - 3 Mbps)
NTIA Tier 5 (3 Mbps - 6 Mbps)
NTIA Tier 6 (6 Mbps -10 Mbps)
NTIA Tier 7 (10 Mbps - 25 Mbps)
NTIA Tier 8 (25 Mbps - 50 Mbps)
NTIA Tier 9-11 (Greater Than 50 Mbps)
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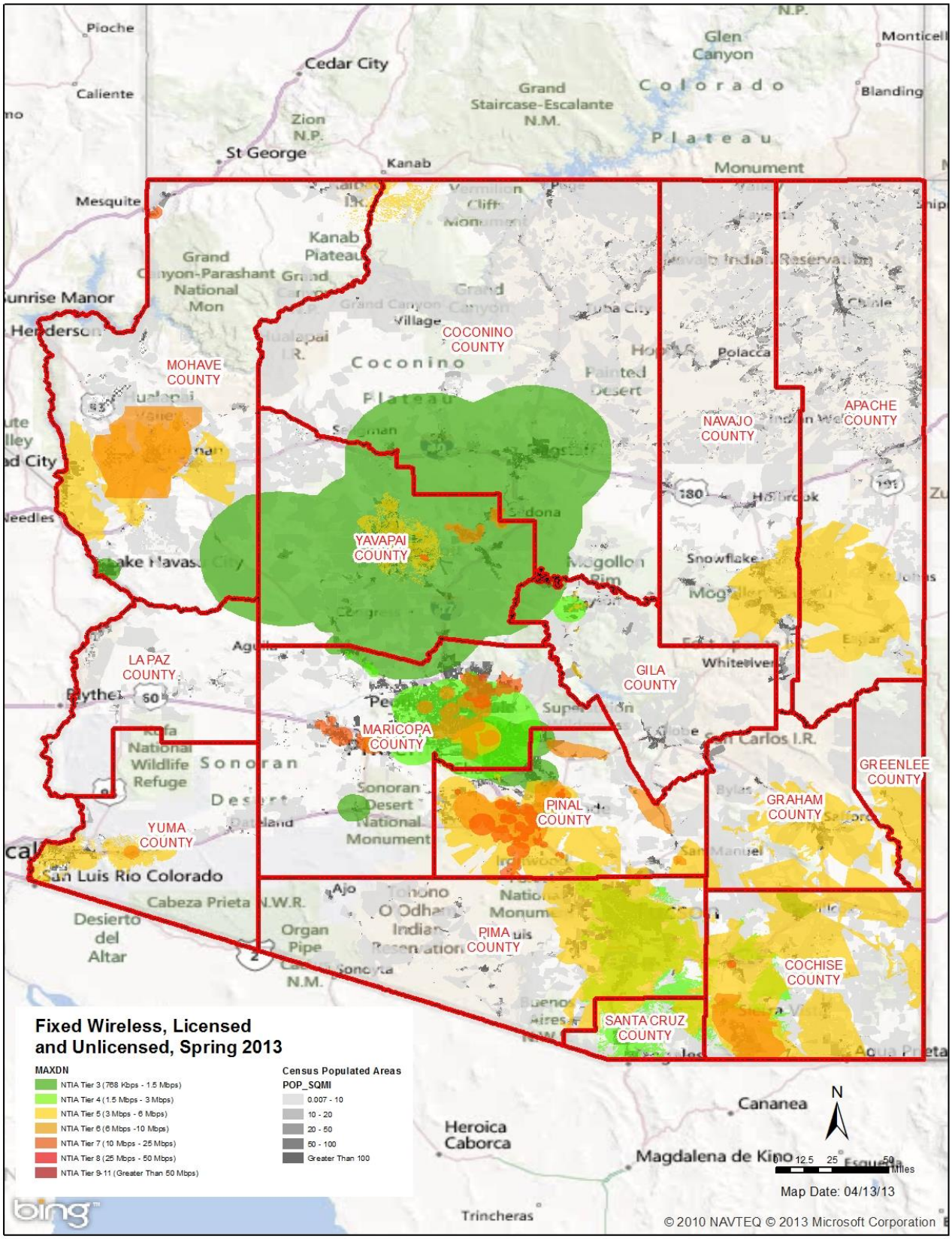
Fixed Wireless, Licensed and Unlicensed, Spring 2013
MAXDN
NTIA Tier 3 (768 Kbps - 1.5 Mbps)
NTIA Tier 4 (1.5 Mbps - 3 Mbps)
NTIA Tier 5 (3 Mbps - 6 Mbps)
NTIA Tier 6 (6 Mbps -10 Mbps)
NTIA Tier 7 (10 Mbps - 25 Mbps)
NTIA Tier 8 (25 Mbps - 50 Mbps)
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COCONINO COUNTY
MOHAVE COUNTY
YAVAPAI COUNTY
NAVAJO COUNTY
APACHE COUNTY
GILA COUNTY
LA PAZ COUNTY
MARICOPA COUNTY
PINAL COUNTY
GREENLEE COUNTY
GRAHAM COUNTY
YUMA COUNTY
PIMA COUNTY
COCHISE COUNTY
SANTA CRUZ COUNTY
Map Date: 04/13/13
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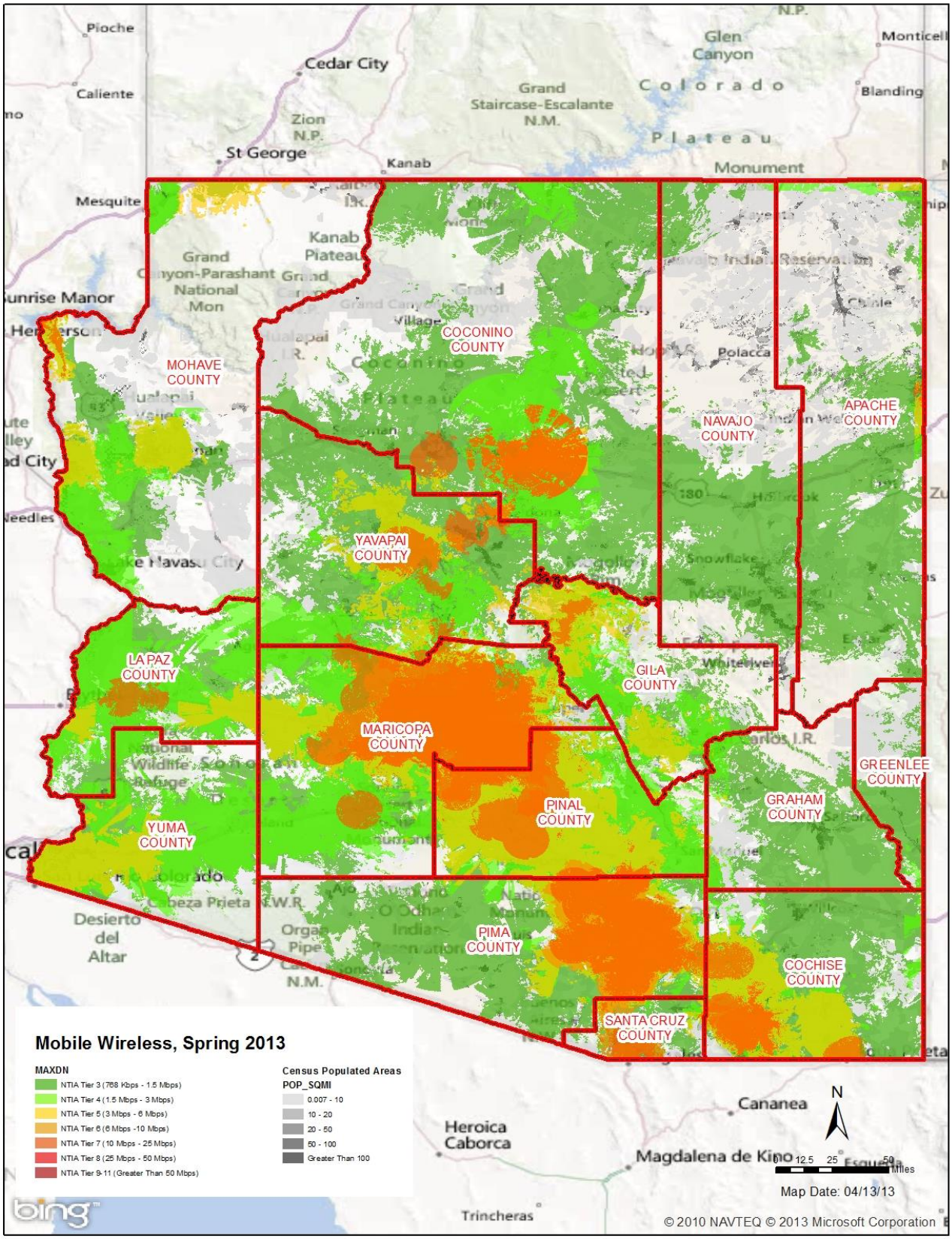
Mobile Wireless, Spring 2013
MAXDN
NTIA Tier 3 (768 Kbps - 1.5 Mbps)
NTIA Tier 4 (1.5 Mbps - 3 Mbps)
NTIA Tier 5 (3 Mbps - 6 Mbps)
NTIA Tier 6 (6 Mbps -10 Mbps)
NTIA Tier 7 (10 Mbps - 25 Mbps)
NTIA Tier 8 (25 Mbps - 50 Mbps)
NTIA Tier 9-11 (Greater Than 50 Mbps)
Census Populated Areas
POP_SQMI
0.007 - 10
10 - 20
20 - 50
50 - 100
Greater Than 100
COCONINO COUNTY
MOHAVE COUNTY
NAVAJO COUNTY
APACHE COUNTY
YAVAPAI COUNTY
LA PAZ COUNTY
GILA COUNTY
MARICOPA COUNTY
GREENLEE COUNTY
GRAHAM COUNTY
PINAL COUNTY
YUMA COUNTY
PIMA COUNTY
COCHISE COUNTY
SANTA CRUZ COUNTY
Map Date: 04/13/13
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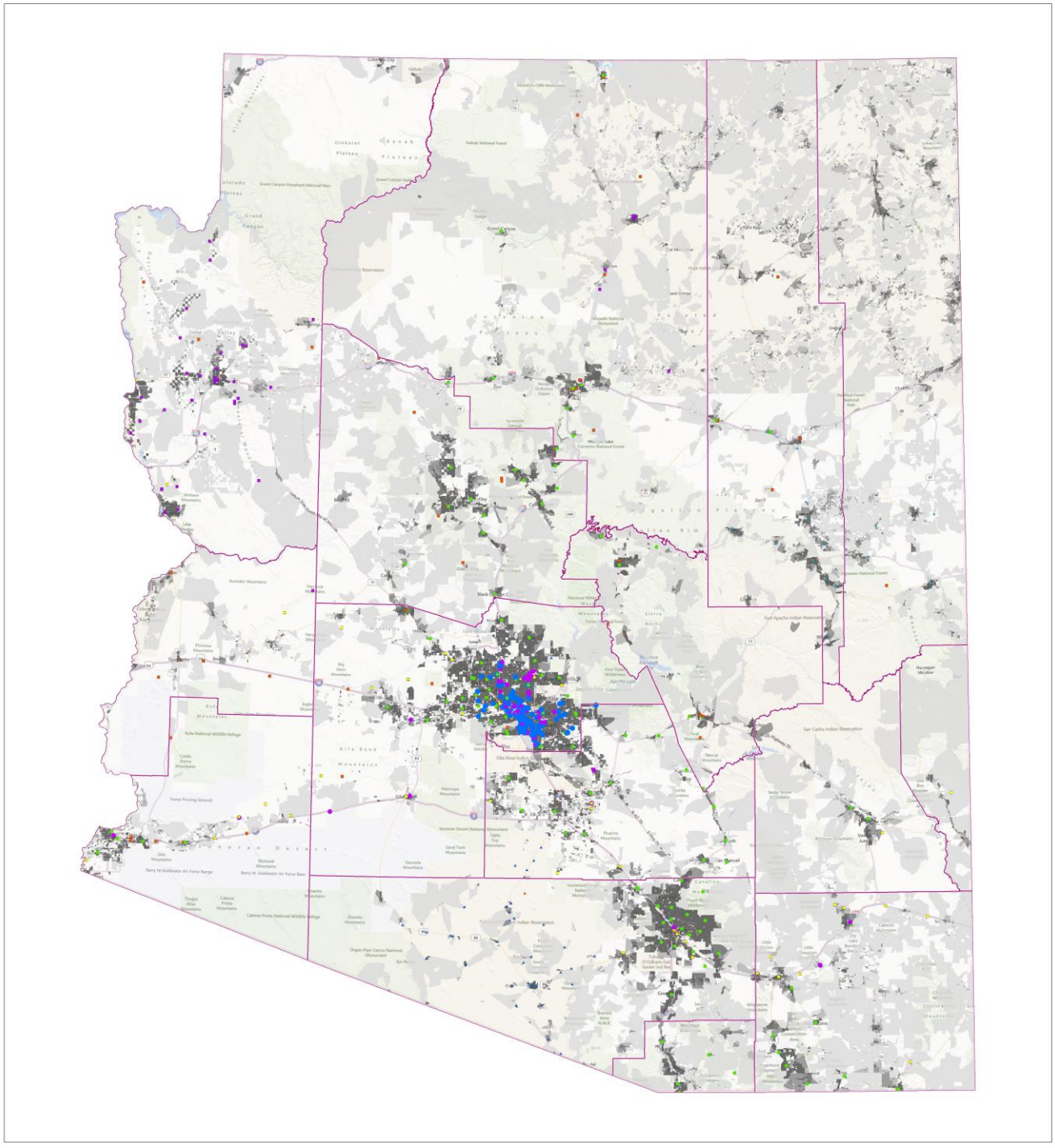


Arizona Broadband Mapping Program

Middle Mile Providers

SPRING 2013 SUBMITTAL

Census Population/Sq. Mile

- Less Than 10
- 10 - 20
- 20 - 50
- 50 - 100
- Greater Than 100

Spring 2013: Middle Mile Points

DBA NAME, Number of Points

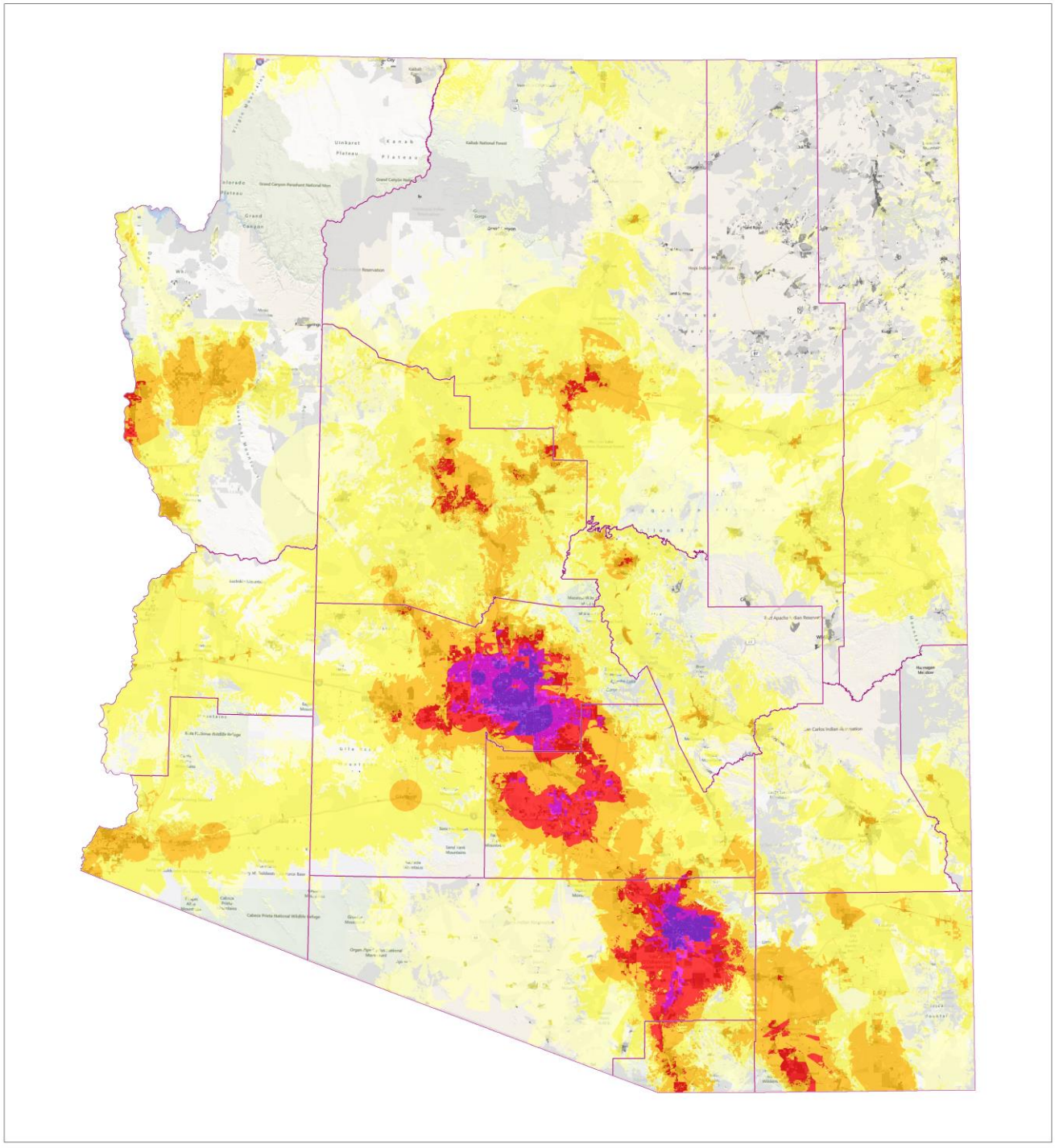
- AT&T Mobility LLC, 1
- Saddleback Communications, 2
- TW Telecom of Arizona LLC, 2
- Covad Communications Company, 3
- Mediacom Southeast, 3
- Sprint, 3
- TDS Telecom, 3
- Trucom, 4
- Fort Mojave Telecommunications Inc., 5
- T-Mobile, 6
- CoxCom Inc, 10
- AZNet, 15
- Cellular One of NE Arizona, 17
- Integra Telecom, 24
- Tohono O Odham Utility Authority, 37
- Wecom, 44
- Airband Communications Inc, 52
- Level3 Communications LLC, 64
- CenturyLink, 136
- Zayo Enterprise Networks LLC, 147
- Salt River Project, 264

N

Miles 0 5 10 20 30 40

Map Date: 04/24/2012
Author: TerraSystems SW, Inc.
File: AZBB_MMPoints_Spring2013.mxd

Note: Analysis for Census Block, Road Segment Buffers and Wireless Polygons. Some FRNs have more than one reported technology and/or spectra Does not include Satellite Providers.



Arizona Broadband Mapping Program

Provider Count (unique FRN's) - All Technologies and Spectra Except Satellite
SPRING 2013 SUBMITTAL

SPRING 2013: Provider Count

- 1
- 2 - 3
- 4 - 6
- 7 - 9
- 10 - 11
- 12 - 17
- 18 - 20

Census 2010, Population per Square Mile

- Less Than10
- 10 - 20
- 20 - 50
- 50 - 100
- Greater Than 100

N

Miles
0 5 10 20 30 40

Map Date: 04/22/2012
Author: TerraSystems SW, Inc.
File: AZBB_ProviderCount_Spring2013_wPopDensity.mxd

Note: Analysis for Census Block, Road Segment Buffers and Wireless Polygons. Some FRNs have more than one reported technology and/or spectra Does not include Satellite Providers.

Appendix C - Arizona Broadband Coverage Tables for Spring 2013

All Technologies: Coverage for 768 Kbps Down and Above
All Technologies: Coverage for 3 Mbps Down and Above
All Technologies: Coverage for 6 Mbps Down and Above

DSL, xDSL & Other Copper: Coverage for 768 Kbps Down and Above
DSL, xDSL & Other Copper: Technologies Coverage for 3 Mbps Down and Above
DSL, xDSL & Other Copper: Technologies Coverage for 6 Mbps Down and Above

Cable Modem: Coverage for 768 Kbps Down and Above
Cable Modem: Coverage for 3 Mbps Down and Above
Cable Modem: Coverage for 6 Mbps Down and Above
Cable Modem: Coverage for 10 Mbps Down and Above

Fixed Wireless: Coverage for 768 Kbps Down and Above
Fixed Wireless: Coverage for 3 Mbps Down and Above
Fixed Wireless: Coverage for 6 Mbps Down and Above

Mobile Wireless: Coverage for 768 Kbps Down and Above
Mobile Wireless: Coverage for 3 Mbps Down and Above
Mobile Wireless: Coverage for 6 Mbps Down and Above

Arizona Broadband Coverage Table Notes:

Data presented in the sixteen tables that follow is as collected by the State of Arizona for the NTIA and FCC broadband maps and submitted in Spring 2013 for Broadband Provider (BP) coverage declared as of 12/31/12.

The Census Bureau identifies two types of urban areas: **Urbanized Areas (UAs)** of 50,000 or more people and **Urban Clusters (UCs)** of at least 2,500 and less than 50,000 people. Per the Census Bureau, **"Rural"** encompasses all population, housing, and territory not included within Urbanized Areas (UAs). For Arizona analysis purposes, **"Sparsely Populated Rural"** encompasses all population, housing, and territory not included within either Urbanized Areas (UA) or Urban Clusters (UC). Using an Urban Area/Cluster GIS Layer, Arizona is calculated to have a total of 241,666 Census Blocks per the 2010 Census of which:

- 86,648 Census Blocks are in Urban Areas (UAs)
- 19,479 Census Blocks are in Urban Clusters (UCs)
- 106,127 Census Blocks total are in Urban Areas (UAs) or Urban Clusters (UCs)
- 155,018 Census Blocks are in Rural areas (Outside UAs only) with a population count of 1,274,234 and household count of 601,889
- 135,539 Census Blocks are in Sparsely Populated Rural areas (Outside both UAs and UCs) with a population count of 651,358 and household count of 329,022

For wireline providers, census blocks greater than 2 square miles intersected by covered road segments were added to their reported list of census blocks less than or equal to 2 sq. mi. For fixed and mobile wireless providers, census block counts were based on census blocks that intersected (were touched by) an overlaying wireless provider's service area. Satellite providers which tend to offer lower downstream and upstream data rates are not included in the Broadband Providers (BPs) for purposes of this analysis. All census blocks, regardless of area or water characteristic were included in this analysis.

Table 1: All Technologies: Coverage for 768 Kbps Down and Above

(For Spring 2013, All NTIA Codes for All Tech Types (except Satellite) and MaxAdDown >= 3)

Statewide Coverage Overall	Census Block Count	Population Count	Population %	Household Count	Household %
Census Blocks with One Provider	23,903	61,563	0.96%	26,549	0.93%
Census Blocks with Two or More Providers	192,559	6,298,774	98.54%	2,803,735	98.57%
Total Coverage: Census Blocks with One or More Providers	**216,462**	**6,360,337**	**99.50%**	**2,830,284**	**99.50%**
Total Uncovered: Census Blocks with No Provider	25,204	31,680	0.50%	14,242	0.50%
Statewide Totals	**241,666**	**6,392,017**	**100.00%**	**2,844,526**	**100.00%**
Rural Coverage	**Census Block Count**	**Population Count**	**Population %**	**Household Count**	**Household %**
Census Blocks with One Provider	23,903	61,563	4.83%	26,549	4.41%
Census Blocks with Two or More Providers	105,911	1,180,991	92.68%	561,098	93.22%
Total Coverage: Census Blocks with One or More Providers	**129,814**	**1,242,554**	**97.51%**	**587,647**	**97.63%**
Total Uncovered: Census Blocks with No Provider	25,204	31,680	2.49%	14,242	2.37%
Rural Totals	**155,018**	**1,274,234**	**100.00%**	**601,889**	**100.00%**
Sparsely Populated Rural Coverage	**Census Block Count**	**Population Count**	**Population %**	**Household Count**	**Household %**
Census Blocks with One Provider	23,318	47,895	7.35%	22,872	6.95%
Census Blocks with Two or More Providers	87,052	571,954	87.81%	291,956	88.73%
Total Coverage: Census Blocks with One or More Providers	**110,370**	**619,849**	**95.16%**	**314,828**	**95.69%**
Total Uncovered: Census Blocks with No Provider	25,169	31,509	4.84%	14,194	4.31%
Sparsely Populated Rural Totals	**135,539**	**651,358**	**100.00%**	**329,022**	**100.00%**

Table 2: All Technologies: Coverage for 3 Mbps Down and Above

(For Spring 2013, All NTIA Codes for All Tech Types (except Satellite) and MaxAdDown >= 5)

Statewide Coverage Overall	Census Block Count	Population Count	Population %	Household Count	Household %
Census Blocks with One Provider	26,195	138,044	2.16%	67,398	2.37%
Census Blocks with Two or More Providers	148,807	6,111,477	95.61%	2,706,896	95.16%
Total Coverage: Census Blocks with One or More Providers	**175,002**	**6,249,521**	**97.77%**	**2,774,294**	**97.53%**
Total Uncovered: Census Blocks with No Provider	66,664	142,496	2.23%	70,232	2.47%
Statewide Totals	**241,666**	**6,392,017**	**100.00%**	**2,844,526**	**100.00%**
Rural Coverage	**Census Block Count**	**Population Count**	**Population %**	**Household Count**	**Household %**
Census Blocks with One Provider	25,958	137,273	10.77%	66,662	11.08%
Census Blocks with Two or More Providers	62,396	994,465	78.04%	464,995	77.26%
Total Coverage: Census Blocks with One or More Providers	**88,354**	**1,131,738**	**88.82%**	**531,657**	**88.33%**
Total Uncovered: Census Blocks with No Provider	66,664	142,496	11.18%	70,232	11.67%
Rural Totals	**155,018**	**1,274,234**	**100.00%**	**601,889**	**100.00%**
Sparsely Populated Rural Coverage	**Census Block Count**	**Population Count**	**Population %**	**Household Count**	**Household %**
Census Blocks with One Provider	23,343	91,176	14.00%	49,867	15.16%
Census Blocks with Two or More Providers	46,604	440,612	67.65%	216,374	65.76%
Total Coverage: Census Blocks with One or More Providers	**69,947**	**531,788**	**81.64%**	**266,241**	**80.92%**
Total Uncovered: Census Blocks with No Provider	65,592	119,570	18.36%	62,781	19.08%
Sparsely Populated Rural Totals	**135,539**	**651,358**	**100.00%**	**329,022**	**100.00%**

Table 3 All Technologies: Coverage for 6 Mbps Down and Above

(For Spring 2013, All NTIA Codes for All Tech Types (except Satellite) and MaxAdDown >= 6)

Statewide Coverage Overall	Census Block Count	Population Count	Population %	Household Count	Household %
Census Blocks with One Provider	24,366	291,303	4.56%	145,140	5.10%
Census Blocks with Two or More Providers	124,262	5,821,467	91.07%	2,562,733	90.09%
Total Coverage: Census Blocks with One or More Providers	**148,628**	**6,112,770**	**95.63%**	**2,707,873**	**95.20%**
Total Uncovered: Census Blocks with No Provider	93,038	279,247	4.37%	136,653	4.80%
Statewide Totals	**241,666**	**6,392,017**	**100.00%**	**2,844,526**	**100.00%**
Rural Coverage	**Census Block Count**	**Population Count**	**Population %**	**Household Count**	**Household %**
Census Blocks with One Provider	21,514	224,771	17.64%	110,182	18.31%
Census Blocks with Two or More Providers	40,848	773,196	60.68%	358,159	59.51%
Total Coverage: Census Blocks with One or More Providers	**62,362**	**997,967**	**78.32%**	**468,341**	**77.81%**
Total Uncovered: Census Blocks with No Provider	92,656	276,267	21.68%	133,548	22.19%
Rural Totals	**155,018**	**1,274,234**	**100.00%**	**601,889**	**100.00%**
Sparsely Populated Rural Coverage	**Census Block Count**	**Population Count**	**Population %**	**Household Count**	**Household %**
Census Blocks with One Provider	16,747	114,198	17.53%	61,633	18.73%
Census Blocks with Two or More Providers	29,023	324,312	49.79%	155,092	47.14%
Total Coverage: Census Blocks with One or More Providers	**45,770**	**438,510**	**67.32%**	**216,725**	**65.87%**
Total Uncovered: Census Blocks with No Provider	89,769	212,848	32.68%	112,297	34.13%
Sparsely Populated Rural Totals	**135,539**	**651,358**	**100.00%**	**329,022**	**100.00%**

Table 4: DSL, xDSL & Other Copper: Coverage for 768 Kbps Down and Above

For Spring 2013, NTIA Codes of Tech 10-30 and MaxAdDown >= 3)

Statewide Coverage Overall	Census Block Count	Population Count	Population %	Household Count	Household %
Census Blocks with One Provider	58,472	1,644,898	25.73%	735,471	25.86%
Census Blocks with Two or More Providers	74,690	4,307,001	67.38%	1,905,415	66.99%
Total Coverage: Census Blocks with One or More Providers	**133,162**	**5,951,899**	**93.11%**	**2,640,886**	**92.84%**
Total Uncovered: Census Blocks with No Provider	108,504	440,118	6.89%	203,640	7.16%
Statewide Totals	**241,666**	**6,392,017**	**100.00%**	**2,844,526**	**100.00%**
Rural Coverage	**Census Block Count**	**Population Count**	**Population %**	**Household Count**	**Household %**
Census Blocks with One Provider	40,865	762,566	59.85%	352,168	58.51%
Census Blocks with Two or More Providers	11,952	172,126	13.51%	92,636	15.39%
Total Coverage: Census Blocks with One or More Providers	**52,817**	**934,692**	**73.35%**	**444,804**	**73.90%**
Total Uncovered: Census Blocks with No Provider	102,201	339,542	26.65%	157,085	26.10%
Rural Totals	**155,018**	**1,274,234**	**100.00%**	**601,889**	**100.00%**
Sparsely Populated Rural Coverage	**Census Block Count**	**Population Count**	**Population %**	**Household Count**	**Household %**
Census Blocks with One Provider	27,023	281,958	43.29%	144,683	43.97%
Census Blocks with Two or More Providers	10,803	125,383	19.25%	66,174	20.11%
Total Coverage: Census Blocks with One or More Providers	**37,826**	**407,341**	**62.54%**	**210,857**	**64.09%**
Total Uncovered: Census Blocks with No Provider	97,713	244,017	37.46%	118,165	35.91%
Sparsely Populated Rural Totals	**135,539**	**651,358**	**100.00%**	**329,022**	**100.00%**

Table 5: DSL, xDSL & Other Copper: Coverage for 3 Mbps Down and Above

(For Spring 2013, NTIA Codes of Tech 10-30 and MaxAdDown >= 5)

Statewide Coverage Overall	Census Block Count	Population Count	Population %	Household Count	Household %
Census Blocks with One Provider	48,907	1,898,790	29.71%	843,184	29.64%
Census Blocks with Two or More Providers	58,006	3,677,872	57.54%	1,614,656	56.76%
Total Coverage: Census Blocks with One or More Providers	**106,913**	**5,576,662**	**87.24%**	**2,457,840**	**86.41%**
Total Uncovered: Census Blocks with No Provider	134,753	815,355	12.76%	386,686	13.59%
Statewide Totals	**241,666**	**6,392,017**	**100.00%**	**2,844,526**	**100.00%**
Rural Coverage	**Census Block Count**	**Population Count**	**Population %**	**Household Count**	**Household %**
Census Blocks with One Provider	25,756	616,189	48.36%	286,507	47.60%
Census Blocks with Two or More Providers	5,707	83,810	6.58%	45,472	7.55%
Total Coverage: Census Blocks with One or More Providers	**31,463**	**699,999**	**54.93%**	**331,979**	**55.16%**
Total Uncovered: Census Blocks with No Provider	123,555	574,235	45.07%	269,910	44.84%
Rural Totals	**155,018**	**1,274,234**	**100.00%**	**601,889**	**100.00%**
Sparsely Populated Rural Coverage	**Census Block Count**	**Population Count**	**Population %**	**Household Count**	**Household %**
Census Blocks with One Provider	14,578	196,191	30.12%	99,957	30.38%
Census Blocks with Two or More Providers	5,565	76,689	11.77%	41,307	12.55%
Total Coverage: Census Blocks with One or More Providers	**20,143**	**272,880**	**41.89%**	**141,264**	**42.93%**
Total Uncovered: Census Blocks with No Provider	115,396	378,478	58.11%	187,758	57.07%
Sparsely Populated Rural Totals	**135,539**	**651,358**	**100.00%**	**329,022**	**100.00%**

Table 6: DSL, xDSL & Other Copper: Coverage for 6 Mbps Down and Above

(For Spring 2013, NTIA Codes of Tech 10-30 and MaxAdDown >= 6)

Statewide Coverage Overall	Census Block Count	Population Count	Population %	Household Count	Household %
Census Blocks with One Provider	45,416	2,434,996	38.09%	1,068,303	37.56%
Census Blocks with Two or More Providers	41,681	2,668,860	41.75%	1,162,126	40.85%
Total Coverage: Census Blocks with One or More Providers	**87,097**	**5,103,856**	**79.85%**	**2,230,429**	**78.41%**
Total Uncovered: Census Blocks with No Provider	154,569	1,288,161	20.15%	614,097	21.59%
Statewide Totals	**241,666**	**6,392,017**	**100.00%**	**2,844,526**	**100.00%**
Rural Coverage	**Census Block Count**	**Population Count**	**Population %**	**Household Count**	**Household %**
Census Blocks with One Provider	16,770	479,211	37.61%	222,108	36.90%
Census Blocks with Two or More Providers	2,821	47,202	3.70%	24,761	4.11%
Total Coverage: Census Blocks with One or More Providers	**19,591**	**526,413**	**41.31%**	**246,869**	**41.02%**
Total Uncovered: Census Blocks with No Provider	135,427	747,821	58.69%	355,020	58.98%
Rural Totals	**155,018**	**1,274,234**	**100.00%**	**601,889**	**100.00%**
Sparsely Populated Rural Coverage	**Census Block Count**	**Population Count**	**Population %**	**Household Count**	**Household %**
Census Blocks with One Provider	8,648	153,340	23.54%	78,661	23.91%
Census Blocks with Two or More Providers	2,761	43,448	6.67%	22,724	6.91%
Total Coverage: Census Blocks with One or More Providers	**11,409**	**196,788**	**30.21%**	**101,385**	**30.81%**
Total Uncovered: Census Blocks with No Provider	124,130	454,570	69.79%	227,637	69.19%
Sparsely Populated Rural Totals	**135,539**	**651,358**	**100.00%**	**329,022**	**100.00%**

Table 7: Cable Modem: Coverage for 768 Kbps Down and Above

(For Spring 2013, NTIA Codes of Tech 40-41 and MaxAdDown >= 3)

Statewide Coverage Overall	Census Block Count	Population Count	Population %	Household Count	Household %
Census Blocks with One Provider	97,398	5,511,653	86.23%	2,429,221	85.40%
Census Blocks with Two or More Providers	2,589	195,025	3.05%	94,199	3.31%
Total Coverage: Census Blocks with One or More Providers	**99,987**	**5,706,678**	**89.28%**	**2,523,420**	**88.71%**
Total Uncovered: Census Blocks with No Provider	141,679	685,339	10.72%	321,106	11.29%
Statewide Totals	**241,666**	**6,392,017**	**100.00%**	**2,844,526**	**100.00%**
Rural Coverage	**Census Block Count**	**Population Count**	**Population %**	**Household Count**	**Household %**
Census Blocks with One Provider	20,505	657,581	51.61%	309,602	51.44%
Census Blocks with Two or More Providers	1,484	49,426	3.88%	26,885	4.47%
Total Coverage: Census Blocks with One or More Providers	**21,989**	**707,007**	**55.48%**	**336,487**	**55.91%**
Total Uncovered: Census Blocks with No Provider	133,029	567,227	44.52%	265,402	44.09%
Rural Totals	**155,018**	**1,274,234**	**100.00%**	**601,889**	**100.00%**
Sparsely Populated Rural Coverage	**Census Block Count**	**Population Count**	**Population %**	**Household Count**	**Household %**
Census Blocks with One Provider	7,754	176,349	27.07%	95,262	28.95%
Census Blocks with Two or More Providers	1,182	31,669	4.86%	17,496	5.32%
Total Coverage: Census Blocks with One or More Providers	**8,936**	**208,018**	**31.94%**	**112,758**	**34.27%**
Total Uncovered: Census Blocks with No Provider	126,603	443,340	68.06%	216,264	65.73%
Sparsely Populated Rural Totals	**135,539**	**651,358**	**100.00%**	**329,022**	**100.00%**

Table 8: Cable Modem: Coverage for 3 Mbps Down and Above (For Spring 2013, NTIA Codes of Tech 40-41 and MaxAdDown >= 5)					
Statewide Coverage Overall	**Census Block Count**	**Population Count**	**Population %**	**Household Count**	**Household %**
Census Blocks with One Provider	97,460	5,539,859	86.67%	2,445,206	85.96%
Census Blocks with Two or More Providers	2,515	166,007	2.60%	77,775	2.73%
Total Coverage: Census Blocks with One or More Providers	**99,975**	**5,705,866**	**89.27%**	**2,522,981**	**88.70%**
Total Uncovered: Census Blocks with No Provider	141,691	686,151	10.73%	321,545	11.30%
Statewide Totals	**241,666**	**6,392,017**	**100.00%**	**2,844,526**	**100.00%**
Rural Coverage	**Census Block Count**	**Population Count**	**Population %**	**Household Count**	**Household %**
Census Blocks with One Provider	20,500	657,500	51.60%	309,564	51.43%
Census Blocks with Two or More Providers	1,484	49,426	3.88%	26,885	4.47%
Total Coverage: Census Blocks with One or More Providers	**21,984**	**706,926**	**55.48%**	**336,449**	**55.90%**
Total Uncovered: Census Blocks with No Provider	133,034	567,308	44.52%	265,440	44.10%
Rural Totals	**155,018**	**1,274,234**	**100.00%**	**601,889**	**100.00%**
Sparsely Populated Rural Coverage	**Census Block Count**	**Population Count**	**Population %**	**Household Count**	**Household %**
Census Blocks with One Provider	7,753	176,326	27.07%	95,247	28.95%
Census Blocks with Two or More Providers	1,182	31,669	4.86%	17,496	5.32%
Total Coverage: Census Blocks with One or More Providers	**8,935**	**207,995**	**31.93%**	**112,743**	**34.27%**
Total Uncovered: Census Blocks with No Provider	126,604	443,363	68.07%	216,279	65.73%
Sparsely Populated Rural Totals	**135,539**	**651,358**	**100.00%**	**329,022**	**100.00%**

Table 9: Cable Modem: Coverage for 6 Mbps Down and Above (For Spring 2013, NTIA Codes of Tech 40-41 and MaxAdDown >= 6)					
Statewide Coverage Overall	**Census Block Count**	**Population Count**	**Population %**	**Household Count**	**Household %**
Census Blocks with One Provider	97,214	5,534,613	86.59%	2,442,795	85.88%
Census Blocks with Two or More Providers	2,509	165,843	2.59%	77,690	2.73%
Total Coverage: Census Blocks with One or More Providers	**99,723**	**5,700,456**	**89.18%**	**2,520,485**	**88.61%**
Total Uncovered: Census Blocks with No Provider	141,943	691,561	10.82%	324,041	11.39%
Statewide Totals	**241,666**	**6,392,017**	**100.00%**	**2,844,526**	**100.00%**
Rural Coverage	**Census Block Count**	**Population Count**	**Population %**	**Household Count**	**Household %**
Census Blocks with One Provider	20,273	652,534	51.21%	307,264	51.05%
Census Blocks with Two or More Providers	1,478	49,262	3.87%	26,800	4.45%
Total Coverage: Census Blocks with One or More Providers	**21,751**	**701,796**	**55.08%**	**334,064**	**55.50%**
Total Uncovered: Census Blocks with No Provider	133,267	572,438	44.92%	267,825	44.50%
Rural Totals	**155,018**	**1,274,234**	**100.00%**	**601,889**	**100.00%**
Sparsely Populated Rural Coverage	**Census Block Count**	**Population Count**	**Population %**	**Household Count**	**Household %**
Census Blocks with One Provider	7,596	173,406	26.62%	93,827	28.52%
Census Blocks with Two or More Providers	1,176	31,505	4.84%	17,411	5.29%
Total Coverage: Census Blocks with One or More Providers	**8,772**	**204,911**	**31.46%**	**111,238**	**33.81%**
Total Uncovered: Census Blocks with No Provider	126,767	446,447	68.54%	217,784	66.19%
Sparsely Populated Rural Totals	**135,539**	**651,358**	**100.00%**	**329,022**	**100.00%**

Table 10: Cable Modem: Coverage for 10 Mbps Down and Above

(For Spring 2013, NTIA Codes of Tech 40-41 and MaxAdDown >= 7)

Statewide Coverage Overall	Census Block Count	Population Count	Population %	Household Count	Household %
Census Blocks with One Provider	97,214	5,534,613	86.59%	2,442,795	85.88%
Census Blocks with Two or More Providers	2,509	165,843	2.59%	77,690	2.73%
Total Coverage: Census Blocks with One or More Providers	**99,723**	**5,700,456**	**89.18%**	**2,520,485**	**88.61%**
Total Uncovered: Census Blocks with No Provider	141,943	691,561	10.82%	324,041	11.39%
Statewide Totals	**241,666**	**6,392,017**	**100.00%**	**2,844,526**	**100.00%**
Rural Coverage	**Census Block Count**	**Population Count**	**Population %**	**Household Count**	**Household %**
Census Blocks with One Provider	20,273	652,534	51.21%	307,264	51.05%
Census Blocks with Two or More Providers	1,478	49,262	3.87%	26,800	4.45%
Total Coverage: Census Blocks with One or More Providers	**21,751**	**701,796**	**55.08%**	**334,064**	**55.50%**
Total Uncovered: Census Blocks with No Provider	133,267	572,438	44.92%	267,825	44.50%
Rural Totals	**155,018**	**1,274,234**	**100.00%**	**601,889**	**100.00%**
Sparsely Populated Rural Coverage	**Census Block Count**	**Population Count**	**Population %**	**Household Count**	**Household %**
Census Blocks with One Provider	7,596	173,406	26.62%	93,827	28.52%
Census Blocks with Two or More Providers	1,176	31,505	4.84%	17,411	5.29%
Total Coverage: Census Blocks with One or More Providers	**8,772**	**204,911**	**31.46%**	**111,238**	**33.81%**
Total Uncovered: Census Blocks with No Provider	126,767	446,447	68.54%	217,784	66.19%
Sparsely Populated Rural Totals	**135,539**	**651,358**	**100.00%**	**329,022**	**100.00%**

Table 11: Fixed Wireless: Coverage for 768 Kbps Down and Above (For Spring 2013, NTIA Codes of Tech 70-71 and MaxAdDown >= 3)					
Statewide Coverage Overall	**Census Block Count**	**Population Count**	**Population %**	**Household Count**	**Household %**
Census Blocks with One Provider	54,351	904,234	14.15%	434,605	15.28%
Census Blocks with Two or More Providers	104,466	5,150,515	80.58%	2,252,283	79.18%
Total Coverage: Census Blocks with One or More Providers	**158,817**	**6,054,749**	**94.72%**	**2,686,888**	**94.46%**
Total Uncovered: Census Blocks with No Provider	82,849	337,268	5.28%	157,638	5.54%
Statewide Totals	**241,666**	**6,392,017**	**100.00%**	**2,844,526**	**100.00%**
Rural Coverage	**Census Block Count**	**Population Count**	**Population %**	**Household Count**	**Household %**
Census Blocks with One Provider	43,020	431,651	33.88%	213,341	35.45%
Census Blocks with Two or More Providers	30,074	538,386	42.25%	244,731	40.66%
Total Coverage: Census Blocks with One or More Providers	**73,094**	**970,037**	**76.13%**	**458,072**	**76.11%**
Total Uncovered: Census Blocks with No Provider	81,924	304,197	23.87%	143,817	23.89%
Rural Totals	**155,018**	**1,274,234**	**100.00%**	**601,889**	**100.00%**
Sparsely Populated Rural Coverage	**Census Block Count**	**Population Count**	**Population %**	**Household Count**	**Household %**
Census Blocks with One Provider	36,090	198,446	30.47%	111,469	33.88%
Census Blocks with Two or More Providers	22,676	246,398	37.83%	114,110	34.68%
Total Coverage: Census Blocks with One or More Providers	**58,766**	**444,844**	**68.29%**	**225,579**	**68.56%**
Total Uncovered: Census Blocks with No Provider	76,773	206,514	31.71%	103,443	31.44%
Sparsely Populated Rural Totals	**135,539**	**651,358**	**100.00%**	**329,022**	**100.00%**

Table 12: Fixed Wireless: Coverage for 3 Mbps Down and Above

(For Spring 2013, NTIA Codes of Tech 70-71 and MaxAdDown >= 5)

Statewide Coverage Overall	Census Block Count	Population Count	Population %	Household Count	Household %
Census Blocks with One Provider	66,987	2,365,461	37.01%	1,085,764	38.17%
Census Blocks with Two or More Providers	38,444	1,597,932	25.00%	702,577	24.70%
Total Coverage: Census Blocks with One or More Providers	**105,431**	**3,963,393**	**62.01%**	**1,788,341**	**62.87%**
Total Uncovered: Census Blocks with No Provider	136,235	2,428,624	37.99%	1,056,185	37.13%
Statewide Totals	**241,666**	**6,392,017**	**100.00%**	**2,844,526**	**100.00%**
Rural Coverage	**Census Block Count**	**Population Count**	**Population %**	**Household Count**	**Household %**
Census Blocks with One Provider	37,342	528,654	41.49%	261,885	43.51%
Census Blocks with Two or More Providers	16,735	275,057	21.59%	111,758	18.57%
Total Coverage: Census Blocks with One or More Providers	**54,077**	**803,711**	**63.07%**	**373,643**	**62.08%**
Total Uncovered: Census Blocks with No Provider	100,941	470,523	36.93%	228,246	37.92%
Rural Totals	**155,018**	**1,274,234**	**100.00%**	**601,889**	**100.00%**
Sparsely Populated Rural Coverage	**Census Block Count**	**Population Count**	**Population %**	**Household Count**	**Household %**
Census Blocks with One Provider	29,126	228,467	35.08%	120,081	36.50%
Census Blocks with Two or More Providers	12,363	117,937	18.11%	49,336	14.99%
Total Coverage: Census Blocks with One or More Providers	**41,489**	**346,404**	**53.18%**	**169,417**	**51.49%**
Total Uncovered: Census Blocks with No Provider	94,050	304,954	46.82%	159,605	48.51%
Sparsely Populated Rural Totals	**135,539**	**651,358**	**100.00%**	**329,022**	**100.00%**

Table 13: Fixed Wireless: Coverage for 6 Mbps Down and Above

(For Spring 2013, NTIA Codes of Tech 70-71 and MaxAdDown >= 6)

Statewide Coverage Overall	Census Block Count	Population Count	Population %	Household Count	Household %
Census Blocks with One Provider	43,441	2,008,471	31.42%	896,581	31.52%
Census Blocks with Two or More Providers	7,126	213,156	3.33%	95,751	3.37%
Total Coverage: Census Blocks with One or More Providers	**50,567**	**2,221,627**	**34.76%**	**992,332**	**34.89%**
Total Uncovered: Census Blocks with No Provider	191,099	4,170,390	65.24%	1,852,194	65.11%
Statewide Totals	**241,666**	**6,392,017**	**100.00%**	**2,844,526**	**100.00%**
Rural Coverage	**Census Block Count**	**Population Count**	**Population %**	**Household Count**	**Household %**
Census Blocks with One Provider	16,302	245,040	19.23%	111,819	18.58%
Census Blocks with Two or More Providers	3,903	71,107	5.58%	25,381	4.22%
Total Coverage: Census Blocks with One or More Providers	**20,205**	**316,147**	**24.81%**	**137,200**	**22.79%**
Total Uncovered: Census Blocks with No Provider	134,813	958,087	75.19%	464,689	77.21%
Rural Totals	**155,018**	**1,274,234**	**100.00%**	**601,889**	**100.00%**
Sparsely Populated Rural Coverage	**Census Block Count**	**Population Count**	**Population %**	**Household Count**	**Household %**
Census Blocks with One Provider	12,032	98,338	15.10%	45,609	13.86%
Census Blocks with Two or More Providers	2,881	32,288	4.96%	12,515	3.80%
Total Coverage: Census Blocks with One or More Providers	**14,913**	**130,626**	**20.05%**	**58,124**	**17.67%**
Total Uncovered: Census Blocks with No Provider	120,626	520,732	79.95%	270,898	82.33%
Sparsely Populated Rural Totals	**135,539**	**651,358**	**100.00%**	**329,022**	**100.00%**

Table 14: Mobile Wireless: Coverage for 768 Kbps Down and Above

(For Spring 2013, NTIA Codes of Tech 80 and MaxAdDown >= 3)

Statewide Coverage Overall	Census Block Count	Population Count	Population %	Household Count	Household %
Census Blocks with One Provider	37,400	168,832	2.64%	95,577	3.36%
Census Blocks with Two or More Providers	170,129	6,142,350	96.09%	2,716,478	95.50%
Total Coverage: Census Blocks with One or More Providers	**207,529**	**6,311,182**	**98.74%**	**2,812,055**	**98.86%**
Total Uncovered: Census Blocks with No Provider	34,137	80,835	1.26%	32,471	1.14%
Statewide Totals	**241,666**	**6,392,017**	**100.00%**	**2,844,526**	**100.00%**
Rural Coverage	**Census Block Count**	**Population Count**	**Population %**	**Household Count**	**Household %**
Census Blocks with One Provider	37,396	168,832	13.25%	95,577	15.88%
Census Blocks with Two or More Providers	83,485	1,024,567	80.41%	473,841	78.73%
Total Coverage: Census Blocks with One or More Providers	**120,881**	**1,193,399**	**93.66%**	**569,418**	**94.61%**
Total Uncovered: Census Blocks with No Provider	34,137	80,835	6.34%	32,471	5.39%
Rural Totals	**155,018**	**1,274,234**	**100.00%**	**601,889**	**100.00%**
Sparsely Populated Rural Coverage	**Census Block Count**	**Population Count**	**Population %**	**Household Count**	**Household %**
Census Blocks with One Provider	34,177	102,029	15.66%	61,956	18.83%
Census Blocks with Two or More Providers	67,928	485,466	74.53%	239,222	72.71%
Total Coverage: Census Blocks with One or More Providers	**102,105**	**587,495**	**90.20%**	**301,178**	**91.54%**
Total Uncovered: Census Blocks with No Provider	33,434	63,863	9.80%	27,844	8.46%
Sparsely Populated Rural Totals	**135,539**	**651,358**	**100.00%**	**329,022**	**100.00%**

Table 15: Mobile Wireless: Coverage for 3 Mbps Down and Above (For Spring 2013, NTIA Codes of Tech 80 and MaxAdDown >= 5)					
Statewide Coverage Overall	**Census Block Count**	**Population Count**	**Population %**	**Household Count**	**Household %**
Census Blocks with One Provider	29,611	440,932	6.90%	218,569	7.68%
Census Blocks with Two or More Providers	113,991	5,489,056	85.87%	2,384,861	83.84%
Total Coverage: Census Blocks with One or More Providers	**143,602**	**5,929,988**	**92.77%**	**2,603,430**	**91.52%**
Total Uncovered: Census Blocks with No Provider	98,064	462,029	7.23%	241,096	8.48%
Statewide Totals	**241,666**	**6,392,017**	**100.00%**	**2,844,526**	**100.00%**
Rural Coverage	**Census Block Count**	**Population Count**	**Population %**	**Household Count**	**Household %**
Census Blocks with One Provider	25,146	304,360	23.89%	149,281	24.80%
Census Blocks with Two or More Providers	33,231	561,285	44.05%	244,358	40.60%
Total Coverage: Census Blocks with One or More Providers	**58,377**	**865,645**	**67.93%**	**393,639**	**65.40%**
Total Uncovered: Census Blocks with No Provider	96,641	408,589	32.07%	208,250	34.60%
Rural Totals	**155,018**	**1,274,234**	**100.00%**	**601,889**	**100.00%**
Sparsely Populated Rural Coverage	**Census Block Count**	**Population Count**	**Population %**	**Household Count**	**Household %**
Census Blocks with One Provider	19,106	117,119	17.98%	62,480	18.99%
Census Blocks with Two or More Providers	26,906	280,045	42.99%	125,694	38.20%
Total Coverage: Census Blocks with One or More Providers	**46,012**	**397,164**	**60.97%**	**188,174**	**57.19%**
Total Uncovered: Census Blocks with No Provider	89,527	254,194	39.03%	140,848	42.81%
Sparsely Populated Rural Totals	**135,539**	**651,358**	**100.00%**	**329,022**	**100.00%**

Table 16: Mobile Wireless: Coverage for 6 Mbps Down and Above (For Spring 2013, NTIA Codes of Tech 80 and MaxAdDown >= 6)					
Statewide Coverage Overall	**Census Block Count**	**Population Count**	**Population %**	**Household Count**	**Household %**
Census Blocks with One Provider	22,633	442,431	6.92%	204,694	7.20%
Census Blocks with Two or More Providers	97,104	5,117,926	80.07%	2,220,425	78.06%
Total Coverage: Census Blocks with One or More Providers	**119,737**	**5,560,357**	**86.99%**	**2,425,119**	**85.26%**
Total Uncovered: Census Blocks with No Provider	121,929	831,660	13.01%	419,407	14.74%
Statewide Totals	**241,666**	**6,392,017**	**100.00%**	**2,844,526**	**100.00%**
Rural Coverage	**Census Block Count**	**Population Count**	**Population %**	**Household Count**	**Household %**
Census Blocks with One Provider	18,229	268,802	21.10%	123,368	20.50%
Census Blocks with Two or More Providers	20,646	361,564	28.38%	159,667	26.53%
Total Coverage: Census Blocks with One or More Providers	**38,875**	**630,366**	**49.47%**	**283,035**	**47.02%**
Total Uncovered: Census Blocks with No Provider	116,143	643,868	50.53%	318,854	52.98%
Rural Totals	**155,018**	**1,274,234**	**100.00%**	**601,889**	**100.00%**
Sparsely Populated Rural Coverage	**Census Block Count**	**Population Count**	**Population %**	**Household Count**	**Household %**
Census Blocks with One Provider	14,183	135,827	20.85%	62,636	19.04%
Census Blocks with Two or More Providers	16,902	174,203	26.74%	80,416	24.44%
Total Coverage: Census Blocks with One or More Providers	**31,085**	**310,030**	**47.60%**	**143,052**	**43.48%**
Total Uncovered: Census Blocks with No Provider	104,454	341,328	52.40%	185,970	56.52%
Sparsely Populated Rural Totals	**135,539**	**651,358**	**100.00%**	**329,022**	**100.00%**

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Appendix D - Data Submittal Technical Appendix for Spring 2013

Introduction

This document provides broadband data specifications and delivery options for the **Arizona Broadband Assessment Project (AZ BAP)**, which is part of the nationwide **National Telecommunications Information Agency (NTIA)** Broadband Data and Development Program in cooperation with the **Federal Communications Commission (FCC)** through the **American Recovery and Reinvestment Act (ARRA)**. This document is designed to inform and support Arizona's **Broadband Providers (BPs)** who are submitting biannual broadband coverage data. Additional assistance is available through our contact information below.

The Arizona Broadband Assessment Project (AZ BAP) is managed by the **Arizona Strategic Enterprise Technology Office (ASET, formerly GITA),** in conjunction with the **Arizona State Land Department (ASLD)** to meet federal data submittal requirements and contribute to an overall national broadband map and complementary state broadband map, as well as to inform Arizona policy makers and help determine where future improvements in policy, process, and infrastructure should be supported in the State. **Data Site Consortium, Inc. (DSCI)** is acting as the State's Contractor to assist in support of this broadband assessment initiative.

Overview

Under the NTIA program, each **Broadband Provider (BP)** is requested to provide information regarding the availability, technology of transmission and downstream/upstream speed of broadband services if their company or organization:

- Offers broadband services to end users in Arizona, or could do so within a typical service interval without extraordinary effort, or
- Owns facilities in Arizona that make possible the delivery of broadband services by other companies meeting the description above.

Throughout this document, we address how data may be formatted and securely transferred to the State of Arizona through DSCI. The availability and validity of your data is critical to portray your broadband coverage accurately. After reviewing your submitted data, we will get back to you with any questions and feedback, as well as access instructions to download the processed data in map display and GIS formats.

While we ask every BP to submit data in the NTIA format described below, we recognize the significant effort this may require. Ultimately, we seek the data in a format easiest and most practical for the BP and we're glad to provide support in the preparation and submittal of the data. Where possible, we're requesting your data submittal reflect your complete coverage rather than indicating incremental changes from a prior submittal. A "full" submittal of complete data is much more straightforward and less error prone to work with. Please note:

- As broadband technologies and deployments continue to evolve, the NTIA has expanded and/or shifted the acceptable speeds for some technology types. Please see the updated Technical Appendix and new speed vs. technology type chart for more information, especially if you're now delivering higher broadband speeds than previously.

- The federal requirements have shifted to protocols based on Census 2010 census blocks and coding. If you haven't made the shift from earlier versions, we'll be glad to help or work with you in transforming and verifying your data in the newer format.

It is imperative that we capture as much information that correctly depicts a particular coverage area. Where available, provide "homes passed" information or areas that may not have current customers, but are serviceable. ***Beyond your broadband coverage data, the State would like us to collect information as to the actual customer addresses passed or served by you.*** See further details in this Technical Appendix and/or contact us to discuss.

In addition to your broadband coverage data, the State would like us to also collect information as to your number of customers in Arizona for each broadband technology and speed tier you provide and the range of pricing. A convenient table is included in the accompanying cover letter that we would like you to fill out and return via e-mail or mail

Provider data may be uploaded to DSCI and the State of Arizona through a simple, safe, and secure website at https://www.azbbmp.com/. Each provider will be given a unique username and password that will be active only during the submittal period and again when your processed data is ready for your download and review. Refer to page 10 of this document for additional details.

Definitions

"Broadband service" is the provision, on either a commercial or noncommercial basis, of data transmission technology that provides data transmission to and from the Internet with advertised speeds of at least 768 kilobits per second (kbps) downstream, and greater than 200 kbps upstream, to end users.

A "facilities-based" broadband provider offers service connections to end user locations if the company or organization:

1. Owns the portion of the physical facility that terminates at the end user location
2. Obtains unbundled network elements (UNEs), special access lines or other leased facilities that terminate at the end user location and supplies or equips them as broadband, or
3. Supplies or equips a broadband wireless channel to the end user location over licensed or unlicensed wireless spectrums including satellite transmission.

For this purpose, "broadband service" is "available" at a location if the provider does, or could, within a typical service interval (7 to 10 business days) without an extraordinary commitment of resources.

An “end user” of broadband service is a residential or business party, institution, or state or local government entity that may use broadband Internet service for its own purposes, and that does not resell such service to other entities or incorporate such service into retail Internet-access services that it provides. (For this purpose, Internet Service Providers “ISPs” are not “end users.”)

Requested Data

The State of Arizona asks that each BP contribute detailed data for both their wireline and/or wireless coverage areas. In addition to coverage areas, information regarding transmission technology, upstream and downstream speed is also requested.

All data submittals should include “common” information, including,

1. Technology of Transmission
2. Speed (Upstream/Downstream)
3. FRN (FCC Registration Number)

Technology of Transmission

The technology of transmission refers to the methodology or platform(s) by which a BP services their customer. The NTIA has developed a “model” where specific codes depict different technologies:

Code	Description
10	Asymmetric DSL
20	Symmetric DSL
30	Other Copper Wireline - T1, NxT1, EOC
40	Cable Modem - DOCSIS 3.0
41	Cable Modem - Other
50	Optical Fiber or Fiber to the End User (FTTx)
60	Satellite
70	Terrestrial Fixed Wireless - Unlicensed
71	Terrestrial Fixed Wireless - Licensed
80	Terrestrial Mobile Wireless
90	Electric Power Line
0	All Other

Speed Tables

Speed of Broadband service(s) should be specified as both maximum advertised upstream and downstream speeds as well as “typical” speeds achieved by end users. The NTIA has established a set of codes for upstream and downstream bandwidth speeds:

Speed Tier Codes Table		
Upload Speed Tier	Download Speed Tier	Description
2	n/a	Greater than 200 Kbps and less than 768 Kbps
3	3	Greater than or equal to 768 Kbps and less than 1.5 Mbps
4	4	Greater than or equal to 1.5 Mbps and less than 3 Mbps
5	5	Greater than or equal to 3 Mbps and less than 6 Mbps
6	6	Greater than or equal to 6 Mbps and less than 10 Mbps
7	7	Greater than or equal to 10 Mbps and less than 25 Mbps
8	8	Greater than or equal to 25 Mbps and less than 50 Mbps
9	9	Greater than or equal to 50 Mbps and less than 100 Mbps
10	10	Greater than or equal to 100 Mbps and less than 1 Gbps
11	11	Greater than or equal to 1 Gbps

Please note that, for a particular transmission technology, not all speeds are applicable, and submitted data will be checked against the NTIA established applicable speeds for each technology type. Please review the table below for acceptable speed values by technology.

		NTIA Speed Tier Codes									
		2	3	4	5	6	7	8	9	10	11
		> 200 K < 768 K	> 768 K < 1.5 M	> 1.5 M < 3 M	> 3 M < 6 M	> 6 M < 10 M	> 10 M < 25 M	> 25 M < 50 M	> 50 M < 100 M	> 100 M < 1 G	> 1 G
NTIA Technology Codes											
10	Asymmetric xDSL	Maximum Upstream Range									
			Maximum Downstream Range								
20	Symmetric xDSL	Maximum Downstream Range									
			Maximum Downstream Range								
30	Other Copper Wireline	Maximum Upstream Range									
			Maximum Downstream Range								
40	Cable Modem - DOCSIS 3.0	Maxmimum Upstream Range									
									Max Down Range		
41	Cable Modem - Other	Maximum Upstream Range									
			Maximum Downstream Range								
50	Optical Carrier/Fiber to End User	Maximum Upstream Range									
			Maximum Downstream Range								
60	Satellite	Maximum Up Range									
			Maximum Down Range								
70	Terrestrial Fixed Wireless - Unlicensed	Maximum Upstream Range									
			Maximum Downstream Range								
71	Terrestrial Fixed Wireless - Licensed	Maximum Upstream Range									
			Maximum Downstream Range								
80	Terrestrial Mobile Wireless	Maximum Upstream Range									
			Maximum Downstream Range								
90	Electric Power Line	Maximum Upstream Range									
			Maximum Down Range								

FCC Registration Number (FRN)

We ask that each BP provide their FCC Registration Number(s) (FRN). If any BP has more than one FRN, we ask that each data set submitted be tied to one and only one FRN. BPs will multiple operating entities and FRNs can work with us in best reflecting their broadband coverage consistent with their corporate identity and marketing. If in doubt concerning your FRN, please visit https://fjallfoss.fcc.gov/coresWeb/simpleSearch.do for verification.

Wireline Broadband Coverage

Wireline coverage area may be reported by any of the following:

1. Individual street address* where broadband service is available to end users.
2. Road Segments, *allowable only for areas where census blocks are greater than 2.0 square miles in area, using:*
    a. Arizona road centerline data - shapefile format road segments from current local sources are preferred, including all NTIA required fields for address ranges (minimum and maximum address on the segment), street prefix direction, street names, street type, street suffix direction, city, ZIP5 and ZIP4 (if available), with each element in a separate field. Alternatively, each segment can be identified in a table (non-GIS format) with a beginning and ending address range, street prefix direction, street name, street type, street suffix direction, city and ZIP codes in separate fields. Please note that a segment identifier (ID) field to your street network segments will not help us as we do not have access to that network.
    b. US Census TIGER/Line Road Files - shapefile format road segments from the latest Census TIGER files (2009 or 2010) including all NTIA required fields for address ranges, street prefix direction, street names, street types, street suffix direction, city, etc. Alternatively, each segment can be identified in a table (non-GIS format) with a TIGER Line ID (TLID) for the 2009 or 2010 version of Census TIGER files. BPs should indicate which Census version (2009 or 2010) was used in preparing the submittal.
3. Census block, *allowable only for areas where census blocks are less than or equal to 2.0 square miles in area.*

** Please note that in all cases, wireline broadband availability will be aggregated to Census Block (for blocks <= 2 square miles) or Street Segment (for blocks > 2 square miles) as per the NTIA specifications,* ***and in no case will specific addresses be included in the Arizona or federal broadband maps.***

** Please note that federal requirements have shifted to protocols based on Census 2010 census blocks and coding. If you haven't made the shift from earlier versions, we'll be glad to help or work with you in transforming and verifying your data in the newer format. When providing data coverage by Census Block, please specify 2000, 2009 or 2010 census information to correctly identify the Census Block FIPS code.*

For those providers who wish to submit FCC Form 477 data, it is imperative that we have information that is more granular than census tract data. We will work with you to review, verify, and adjust such data to properly reflect your broadband coverage.

Any provider offering service boundary/areas, please make it available to DSCI in an appropriate GIS (Geographical Information System) format such as an ESRI shapefile or Google Earth file (KML/KMZ).

Wireline Data Format

By Address - Defined as broadband service available, including service type and advertised speed, to a specific "end user" by physical address. Typical submittal formats include excel spreadsheets, flat text files (.csv or .txt) and database tables (Access or SQL). Data should represent the following fields:

FRN	Address	City	State	ZIP4	Technology of Transmission	Maximum Downstream Speed	Maximum Upstream Speed	Typical Downstream Speed	Typical Upstream Speed
19567460	123 Main St	Here	AZ	88888	10	6	2	5	2
19567460	222 1st Ave	There	AZ	88800	41	5	2	4	1
19567460	445 Elm St	Every	AZ	87654	50	10	7	9	7

Where possible, include the category of end user by the following:

Code	Description
1	Residential user
2	Governmental user
5	Other

By Census Block - In lieu of reporting address-specific data, BPs may provide list of all census blocks, **two square miles or less in area,** in which broadband service is available to end users, along with the same service characteristics address points contain (technology of transmission and maximum and typical speeds).

If this option is employed, BPs are encouraged to use geographic information system (GIS) compatible software to select a subset of census blocks. Please include the full 15 digit FIPS (Federal Information Processing Standards) Census Block ID. These can be identifiers for Census 2009 or 2010 Census Blocks, however please specify which version was used. GIS formats for these resources can be found at the U.S. Census Bureau download sites:

- US Census Bureau's 2009 TIGER/line files at http://www.census.gov/geo/www/tiger/tgrshp2009/tgrshp2009.html
- US Census Bureau's 2010 TIGER/line files at http://www.census.gov/geo/www/tiger/tgrshp2010/tgrshp2010.html

Data should represent the following fields:

FRN	Census Block 15-digit FIPS	Technology of Transmission	Maximum Downstream Speed	Maximum Upstream Speed	Typical Downstream Speed	Typical Upstream Speed
19567460	40059412001036	10	6	2	5	2
19567460	40159501003174	41	5	2	4	1
19567460	40139410001010	50	10	7	9	7

By Road Segment - in lieu of reporting address-specific data, BPs may report a list of street segments with address ranges in which broadband service is available to end users along with the same service characteristics address points (technology of transmission and speed).

If this option is employed, BPs are encouraged to use geographic information system (GIS) compatible software to select a subset of road segments (from either of the GIS datasets listed below). The basic service information fields (Technology of Transmission, Maximum Advertised Downstream/Upstream speed and Typical Downstream/Upstream speed) should then be attached to each road segment to characterize the broadband service along each road.

US Census Bureau TIGER/line shapefiles can be accessed at the previously listed sites. Again, please report which data set was used in preparing your data.

FRN	Min Address	Max Address	Prefix Dir	Street name	Street type	City	State	ZIP
19567460	1	100	E	Easy	Ln	Here	AZ	88888
19567460	101	250	E	Easy	Ln	Here	AZ	88888
19567460	301	399	W	First	St	There	AZ	87654

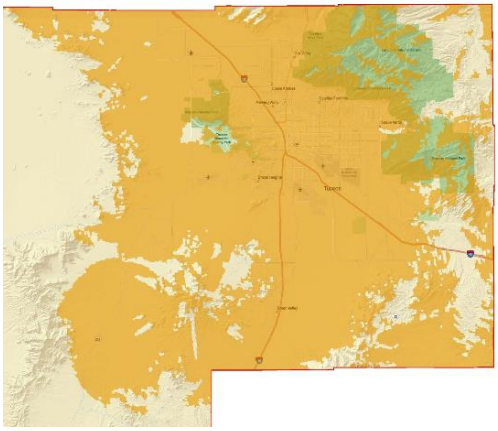
Wireless Broadband Cover - Fixed, Mobile & Satellite

We would prefer that all information submitted for this requirement is in a **geographic data format with polygons depicting wireless service areas** and associated service characteristics (technology of transmission, speed), but may be reported by any of the following:

1. ESRI shapefile
2. Google Earth as either .kml or .kmz
3. Tower location, including
   a) Latitude and Longitude
   b) Tower height and/or Equipment height
   c) Spectrum Used
   d) Antenna specifications (omnidirectional, sectorized, etc) - if using sectorized, provide Azimuth direction and beamwidth (60 degrees, 90 degrees, 180 degrees)

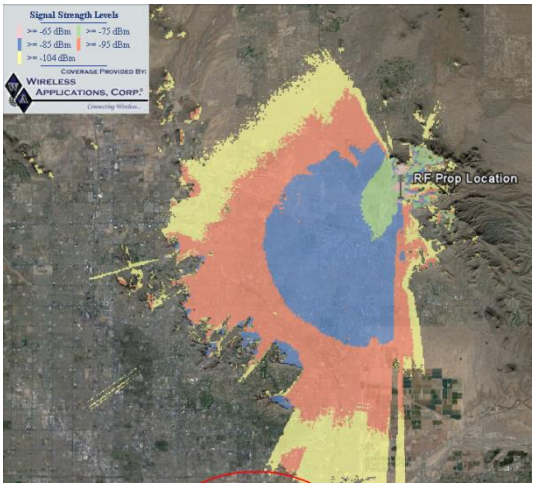
ESRI Shapefile

Please include attribute fields or metadata depicting technology of transmission, lat/long, tower height and maximum upstream/downstream speeds.



Google Earth

Please include metadata depicting technology of transmission, lat/long, tower height and maximum upstream/downstream speeds.

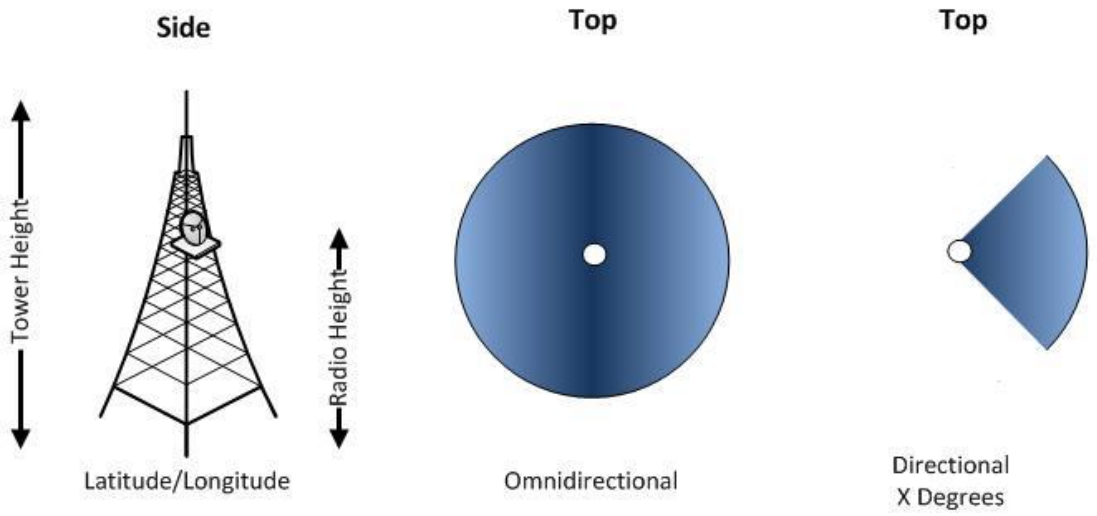


Tower Location

For BPs that do not have coverage data in a geographical/polygon format, a description of tower location with lat/long, height, spectrum, azimuth, radiated power, and speed as follows:

Tower Height/Equipment (ft)	FRN	Latitude	Longitude	Technology of Transmission	Maximum Downstream Speed	Maximum Upstream Speed
100/60	0019567460	33.419028	-112.142889	70	5	3
70/60	0019567460	32.995917	-111.745806	70	5	3
50/50	0019567460	35.241944	-111.610722	71	6	4

*include typical upstream/downstream where possible



Wireless Spectrum

The NTIA has developed specific codes for wireless spectrum use, as follows:

Code	Description
1	is Cellular spectrum (824-849MHz; 869-894) used to provide service
2	is 700 MHz spectrum (698-758 MHz; 775-788 MHz; 775-788 MHz) used to provide service
3	is Broadband Personal Communications Services spectrum (1850-1915 MHz; 1930-1995) used to provide service
4	is Advanced Wireless Services spectrum (1710-1755 MHz; 2100-2155) used to provide service
5	is Broadband Radio Service/Educational Broadband Service spectrum (2496-2690 MHz) used to provide service
6	is Unlicensed (including broadcast television "white spaces") spectrum Used to provide service
7	is Specialized Mobile Radio Service (SMR) (817-824 MHz; 862-869 MHz; 896-901 MHz; 935-940 MHz)
8	is Wireless Communications Service (WCS) spectrum (2305-2320 MHz; 2345-2360 MHz), 3650-3700 MHz
9	Satellite (L-band, Big LEO, Little LEO, 2 GHz)

Support

Please direct any questions regarding this document, in its entirety, to:

Nolan Straabe, Data Site Consortium, Inc.
E-mail: nolan@straabe.com, Mobile: 602-999-0143

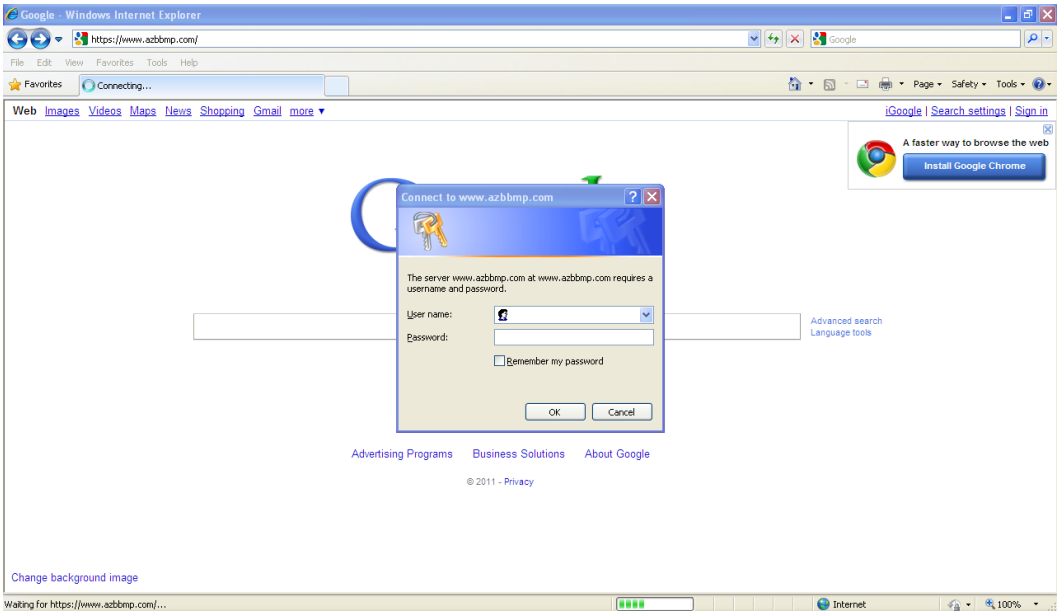
Arizona Broadband Provider Services Portal

http://www.azbbmp.com/

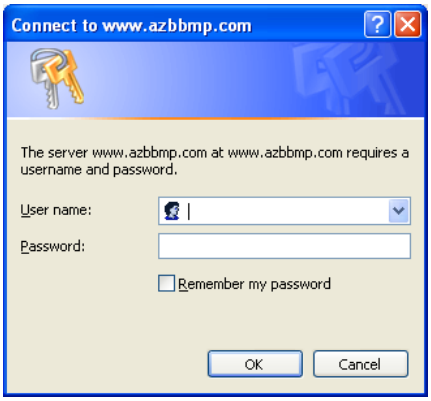
The Arizona Broadband Provider Services Portal was exclusively designed for Arizona Broadband Providers so that they may securely transmit and receive data throughout the life cycle of NTIA/FCC project.

To establish a secure and simple platform, an HTTPS web interface is coupled with unique credentials (username/password) for each broadband provider. There is no need to download any software to use the platform. It will work on any Internet browser, including; Internet Explorer, Safari, Firefox and Chrome.

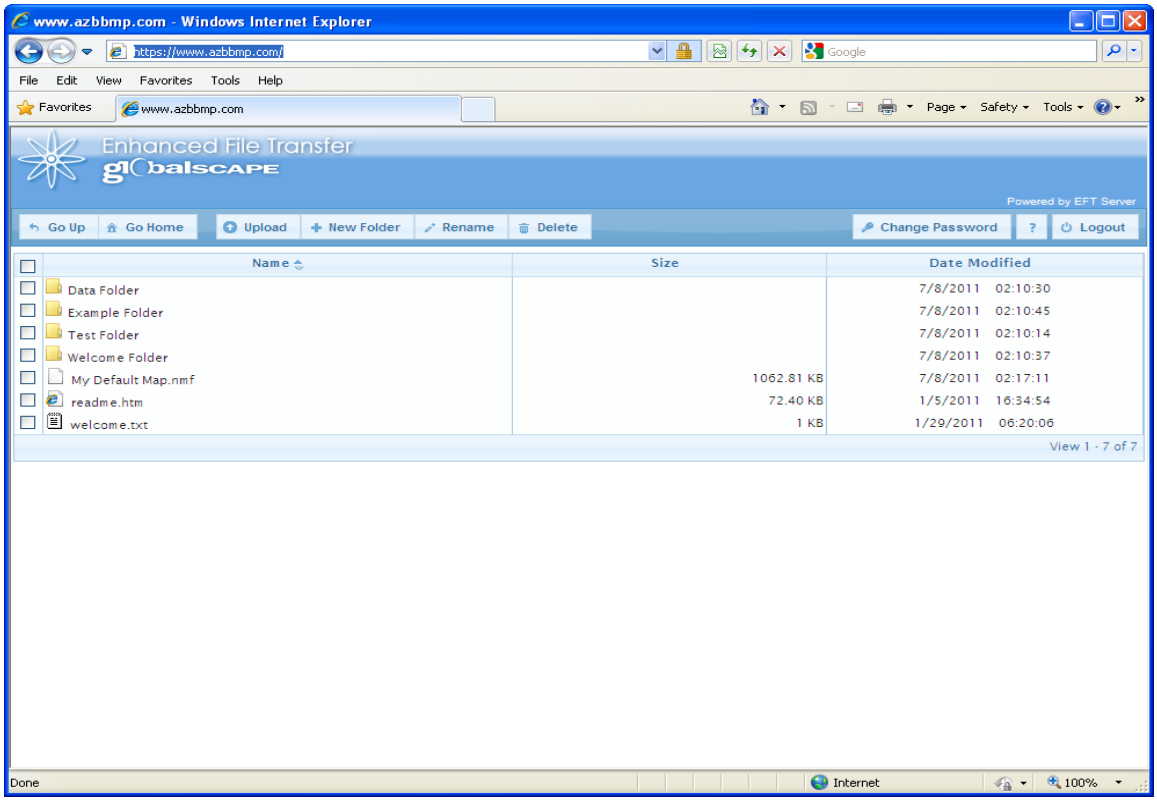
Once a provider has received their username and password, they can reach the portal via https://www.azbbmp.com/ and sign in to their secure account.



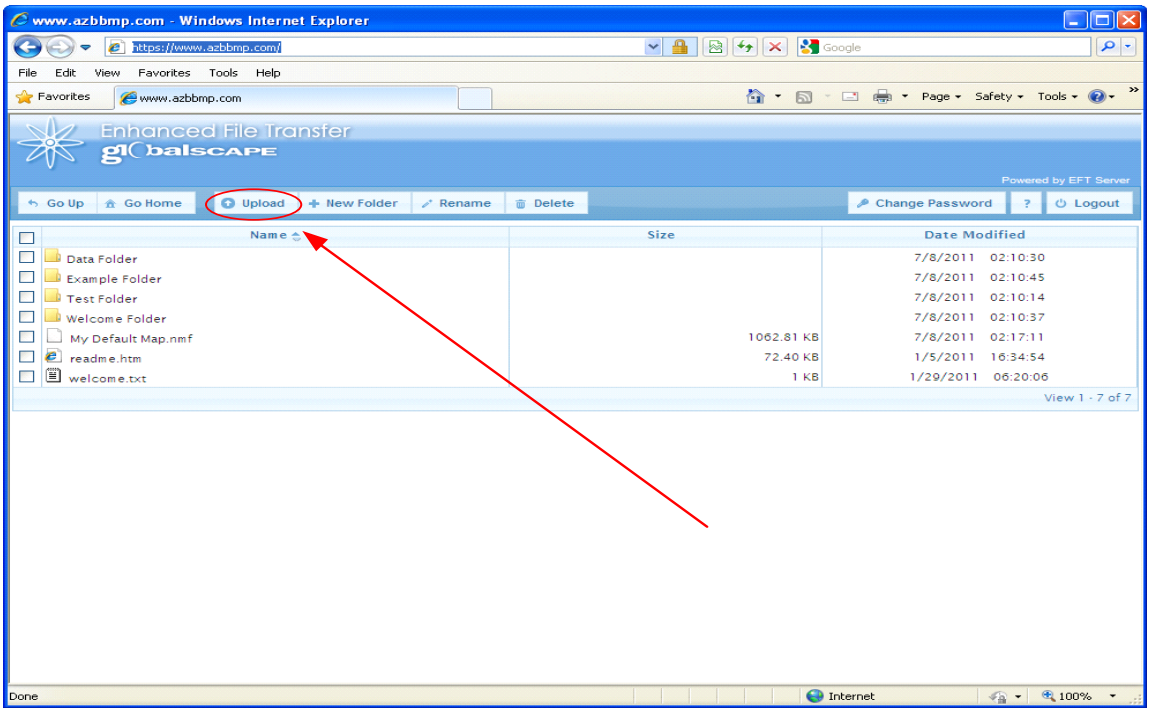
The user will be prompted for their unique credentials to enter the portal. Credentials will only be active during upload and verification timeframes and will be changed for each submittal cycle.



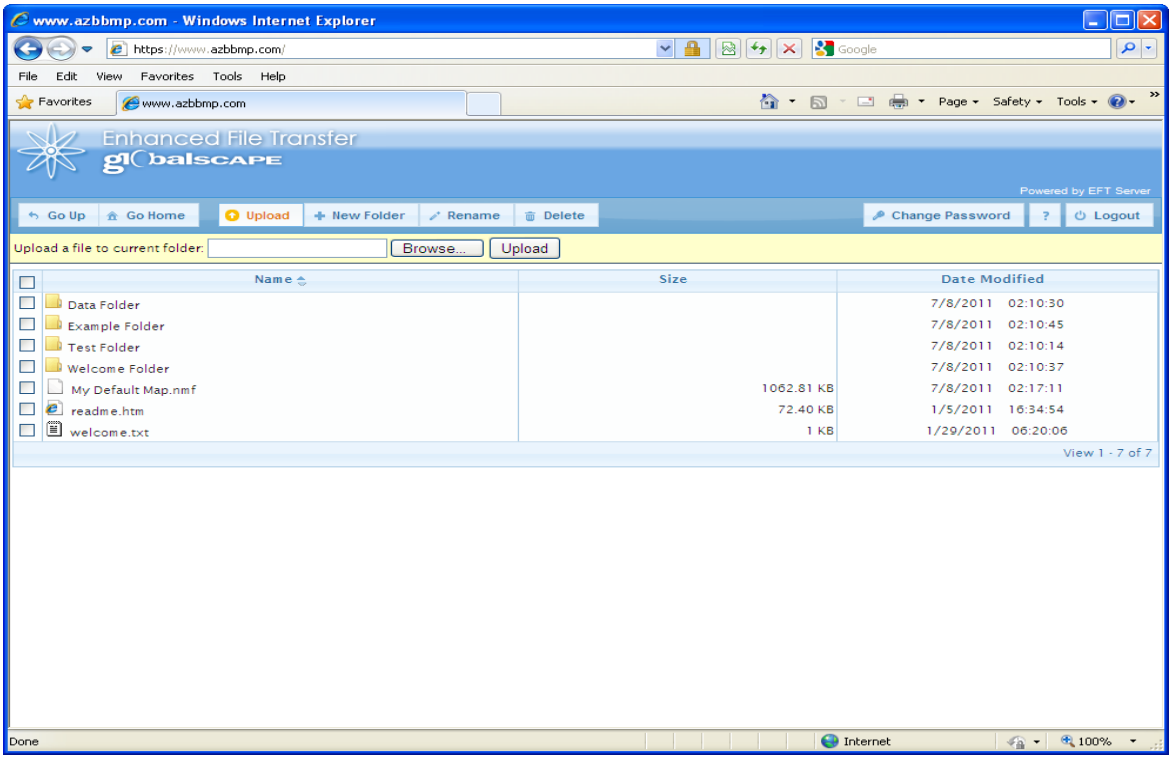
The portal interface enables the end-user upload files from their PC to the server.



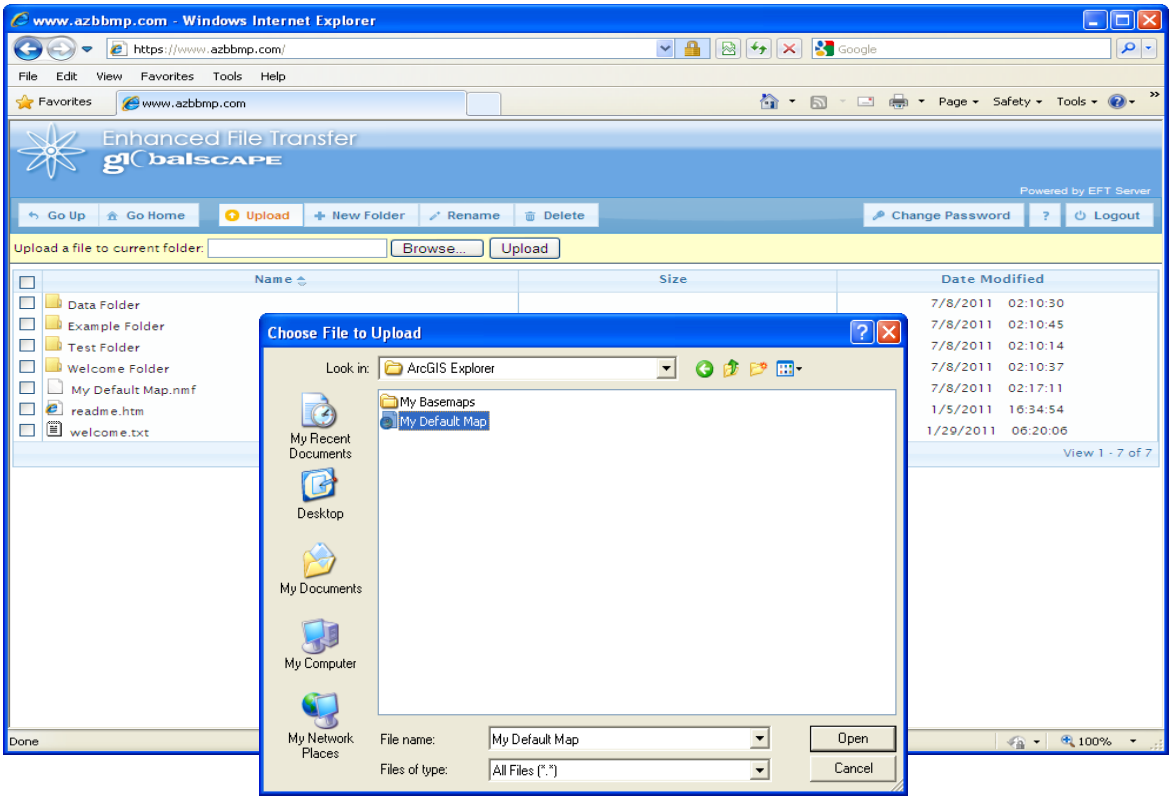
To upload files click the “Upload” button at the top of the page.



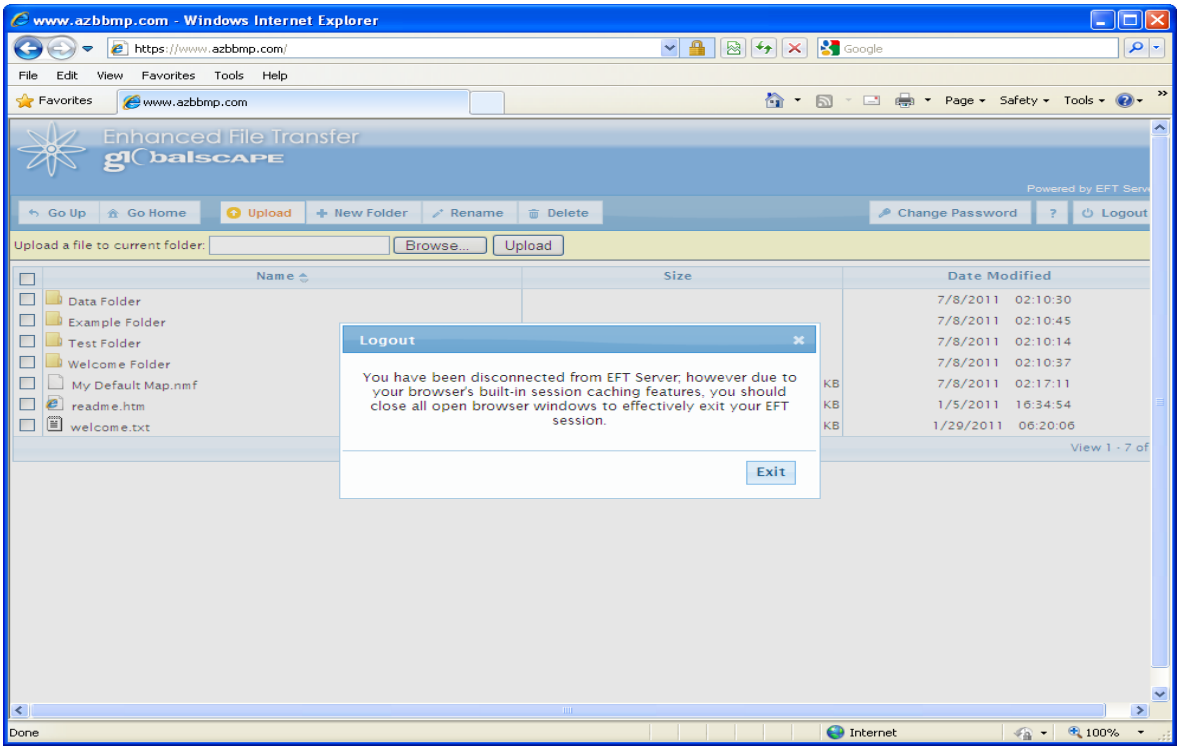
After clicking “Upload” a yellow bar with a field appears below the “Upload” button. Click “Browse” to choose a file from your computer to upload.



Chose your file to upload and click “Open”



Once the file is uploaded, you will see it in the viewer window. When you have completed uploading all of your documents, click “Log Out” in the upper right hand corner.



You have successfully completed your file upload. Thank you.

After the files have been successfully uploaded, the user credentials will be deactivated and the files will be transferred to an off-net, secure and encrypted Network Attached Storage device.

Support

Please direct any questions regarding this document, in its entirety, to:

Nolan Straabe, Data Site Consortium, Inc. (DSCI)
E-mail: nolan@straabe.com, Mobile: 602-999-0143

Data Processing Methods

Provider Participation

In Round 7, the California Public Utilities Commission identified 225 potential broadband providers, 140 of whom did not submit data, and 85 who did. This represents an increase of 3 providers over the prior Round 6. Together, these 85 providers comprise over 99.9% of the total broadband connections in California, according to data contained in the latest FCC Form 477 to which the CPUC has access.

Data Collection

The California Public Utilities Commission (CPUC) sent out a Data Request to broadband providers to initiate the Round 7 data collection. Potential providers were strongly encouraged to submit broadband service availability data. Providers who previously submitted data were also sent maps displaying their Round 6 coverage and validation results to guide their 7th round submissions. Data submission instructions were posted online to assist providers along with template files, sample shapefiles and record formats on the CPUC Broadband Mapping Website at:

http://www.cpuc.ca.gov/PUC/Telco/Information+for+providing+service/BroadBand+Mapping.htm

The data submission instructions point each provider to the wireless and/or wireline datasets, which are separated into sections for those with GIS data (shapefiles or filegeodatabases) and those without GIS data (text or Excel files). For providers with GIS capabilities, statewide census block and TIGER/Line shapefiles were provided on the CPUC website. The square mileage of each block was calculated in advance in the sample census block shapefile. Using the shapefiles, providers were able to determine which blocks in their footprint were less than two square miles and which were two square miles or greater and therefore needed to be represented using the road segment shapefile. For providers without GIS capabilities, Excel spreadsheets were provided incorporating record field formats adhering to the NOFA data submission requirements.

Community Anchor Institutions (CAI)

CAI data is composed of the names and locations of schools, colleges, libraries, healthcare institutions and other community institutions, and the broadband technology and capacity of these institutions.

For each of these institutional categories, the facility data was sourced from the following locations:

- K-12 school data: http://www.cde.ca.gov/ds/si/ and http://nces.ed.gov/ccd/bat/index.asp
- College data: http://nces.ed.gov/ipeds/datacenter/login.aspx

- California health facility data: http://oshpd.ca.gov/General_Info/Healthcare_Atlas.html and http://www.caltelehealth.org/
- Library data: https://harvester.census.gov/imls/data/pls/index.asp

Except for some of the health facility data, the above data sources do not have broadband technology information. Broadband technology and capacity for these facilities was captured using the following data sources:

- CPUC data from the California Teleconnect Fund (CTF) program with additional provider data from AT&T and TelPacific. The CTF program provides 50% discounts on telecommunications bills for qualifying schools, libraries, government-owned and operated hospitals and health clinics, and other community based organizations.
- Corporation for Education Networking Initiatives in California (CENIC) data. CENIC operates the K-12 High Speed Network (K12HSN) program which is funded by California Department of Education. K12HSN enables educators, students and staff across the state to have access to reliable high speed network to deliver high quality online resources to support teaching and learning and promote academic achievement.

Additionally, other nongovernment community organizations not listed above were sourced from the CTF data.

Finally, the CAI addresses were geo-coded to point locations and geo-matched to the Census Blocks 2010 shapefile to obtain the corresponding FULLFIPSID. Technology data was then associated with facility information.

CPUC Initial Data Verification

Each data set submitted by broadband providers was reviewed against the GIS data model posted on the SBDD Network website, and checked if mandatory fields were filled in, and if each field contained the appropriate range of values. Where possible, we made certain that appropriate field headers were used and that each field contained the correct data type. When data was found to be missing or incorrect, the provider was contacted and the issue was documented in a separate provider spreadsheet.

Geo-processing

After the initial CPUC review, data was transferred to the Geographical Information Center (GIC) at CSU Chico for geo-coding, geo-matching, propagation of wireless service by antenna, and validation of geographic data. In those cases where the CPUC received street address level data from broadband providers, such addresses were assigned a point location, (geo-coded) and then geo-matched to census blocks and street segments.

Wireless providers who were unable to submit a shapefile or geographic representation of their service area provided tabular system, tower, and antenna information. Wireless parameters were used to

model the service area, and from that we created a shapefile. The wireless propagation model is based on the Longley-Rice, Irregular Terrain propagation model. Individual unit specifications are used to measure performance based on frequency, transmit power, receiver sensitivity, antenna gain, and height. Signal coverage patterns are produced for each individual unit taking into account terrain and vegetation features that may hinder signal dispersion.

CPUC Final Data Verification

The resulting datasets were delivered from Chico to the CPUC in the SBDD transfer model geodatabase for final review and verification. Data sets were checked again and reviewed for unexpected changes resulting from the geo-coding/geo-matching process. Geo-processed data was visually reviewed using ArcGIS to verify service area footprints, and the SBDD check submission Python script was run on each dataset to identify unexpected values.

Deliverable Data

The final dataset is delivered to the NTIA/FCC in filegeodatabase format containing the following feature classes:

- BB_ConnectionPoint_MiddleMile – Point between the local "last mile" network and the middle mile network which goes on to connect to the internet backbone. This is a confidential dataset.
- BB_Service_CAInstitutions – Community Anchor Institutions: points geo-coded from address lists
- BB_Service_CensusBlock – Broadband availability polygons for areas less than 2 square miles
- BB_Service_Overview – Service overview by County including Subscriber Weighted Nominal Speed
- BB_Service_RoadSegment – Broadband availability line segments for areas 2 square miles and greater
- BB_Service_Wireless – Wireless service area polygons.

Planned Validation Methods

The following validation methods will be conducted on Round 7 data. Detailed maps showing submitted service area footprints and areas that could not be validated will be distributed to each provider for feedback.

FCC Form 477

The FCC uses Form 477 to collect information from providers about broadband connections to end user locations, wired and wireless local telephone services, and interconnected Voice over Internet Protocol (VoIP) services, in individual states at the Census Tract level. A shapefile was created for each provider reflecting the availability of broadband service at each census tract where the provider reported customers of their fixed broadband service. These layers were used to cross reference ISP data

submissions to the CPUC. Customer locations from Form 477 for each provider were used to validate both areas where service is reported as being available, and maximum advertised speeds.

CPUC Mobile Broadband Test Results

The CPUC has developed a mobile broadband testing application for smartphones and data cards, and completed its first field test at 1,200 locations throughout the state in May of 2012, and is currently conducting the second field test as part of a project funded by the state's State Broadband Initiative Grant. The 1,200 locations were selected to represent both urban and rural areas and tribal lands, and involved traveling over 35,000 miles. The application records our testers' actual experience with mobile broadband service from AT&T Mobility, Sprint, T-Mobile and Verizon Wireless. These results are plotted and compared against each operator's coverage area and speed tier. Collected point data will be used to validate the speed/availability of each provider's mobile broadband service in the census block of the test location. In addition, we are using an interpolation model or 'Spline' to predict mobile service areas and speeds throughout the state, as well as to assist validating each mobile provider's speed and availability.

ID Insight, BroadBand Scout

BroadBand Scout is a third party, comprehensive and unbiased dataset specifically designed to show the carriers, connectivity, speed and usage details of the national broadband landscape. ID Insight's patent-pending process analyzes hundreds of millions of internet transactions that link a consumer's physical address to their internet carrier. BroadBand Scout data is provided as tabular point locations geo-matched to the census block level less the two square miles in area and to the street segment level where census blocks are greater than two square miles in area. A shapefile was created for each provider reflecting the presumed availability of broadband service at each census block or street segment where Broadband Scout reported online customer transactions. These layers were used to cross reference ISP data submissions to the CPUC.

TeleAtlas Wire Center and Wire Center Region

The Wire Center Premium product is a comprehensive database for mapping and analyzing wire center service areas. It forms the backbone of the Tele Atlas® Telecommunication Products line. This product lists every Local Exchange Carrier (LEC) landline wire center in the United States. The term "wire center" refers to the location where the telephone company terminates the local lines; this is usually the same location as a central office, although a wire center might house one or more central offices. Buffers were created at 12,000 feet and 18,000 feet from provided Wire Center point datasets to cross reference ISP data submissions to the CPUC. The wire center boundary is a representation of the area served by all of the switching equipment housed at that physical location. Wire Center Region polygon GIS layers were provided and used for cross referencing ISP data submissions to the CPUC.

FCC Consumer Broadband Test (Non-Mobile App)

The FCC Online Consumer Broadband Test collects information regarding the location of the client, the engine used to provide the speed test, download speed, upload speed, latency, jitter, packet loss, minimum round trip time, maximum round trip time, and average round trip time at a specified point location. A shapefile was created to represent each location at which speed tests were performed based on geo-coded address records. All point locations were then geo-matched to the census block level where less the two square miles in area and to street segment level where census blocks are

greater than two square miles in area. These layers were used to cross reference ISP data submissions to the CPUC where sub-broadband speeds were reported and/or where there were no tests performed.

FCC Consumer Broadband Test (Mobile App)

The FCC Mobile Consumer Broadband Test collects information regarding the location of the client, the client's operating system, the engine used to provide the speed test (always OOKLA for mobile tests), download speed, upload speed, and latency, at a specified point location. A shapefile was created to represent each location at which speed tests were performed based on latitude and longitude coordinate pairs. All point locations were then geo-processed to the census block level where less the two square miles in area and to street segment level where census blocks are greater than two square miles in area. These layers were used to cross reference ISP data submissions to the CPUC where sub-broadband speeds were reported and/or where there were no tests performed.

FCC Broadband Dead Zone Reporting Form

The FCC offers a Broadband Dead Zone Reporting Form for recording any address or city level queries done using the National Broadband Map that either failed to return any providers at the specified location, or is a location which a user knows has no service. The FCC Broadband Dead Zone Form collects information regarding the location of the client, whether the client has internet access at their home, what type of internet access the client has at their home, and whether or not the client would be interested in purchasing broadband internet if service options were available. A shapefile was created to represent each location for which dead zone forms were filled out based on geo-coded address records. All point locations were then geo-matched to the census block level, where less than two square miles in area, and to street segment level, where census blocks are greater than two square miles in area. These layers were then used to cross reference ISP data submissions to the CPUC where dead zones and/or no services provided were reported.

California State Map Broadband Service Survey Feedback

The CPUC offers the Broadband Service Survey within its interactive map. The survey records user feedback based on address, city, or zip code level queries against the State's Broadband Availability. It collects information regarding the location of the client, whether the client is accessing the internet from their home, place of business, or any other location, whether or not the client purchases broadband service, and if not, why they choose not to purchase broadband service. A shapefile based on geo-coded address records was created to represent each location for which service surveys were submitted where the respondent indicated non-subscription because of no broadband availability. All recorded locations were then geo-matched to the census block level, where less than two square miles in area, and to the street segment level, where census blocks are greater than two square miles in area. These layers were then used to cross reference ISP data submissions to the CPUC

Data Validation Process

Each individual provider's data was validated independently using all applicable validation methods. The following fields were added to each individual provider's data tables as follows to record validation results and to allow symbology of discrepancies based on validation methods for further interaction

with each provider to refine their data submissions. These fields are not included in the data set the CPUC submits to the NTIA.

- FCC_477 (FCC Form 477)
- BBSCOUT (ID Insight BroadBand Scout)
- TA_WC_REG (TeleAtlas Wire Center Region)
- WC_VAL_12K (TeleAtlas Wire Center 12,000 foot buffer)
- WC_VAL_18K (TeleAtlas Wire Center 18,000 foot buffer)
- VAL12k_18k (TeleAtlas Wire Center 12,000 to 18,000 foot buffer ring)
- DEGRAD_FT (TeleAtlas Wire Center distance)
- FCC_TST (FCC Consumer Broadband Test Non-Mobile App)
- FCC_MOBL (FCC Consumer Broadband Test Mobile App)
- FCC_DZ (FCC Broadband Dead Zone Reporting Form), and
- CA_SRVY (State Map Broadband Service Survey Feedback)
- Mobile speed test point data
- Mobile speed test predicted areas ('Spline')

The final step was a summary statistics report of all validation results for all submitted providers. Summary statistics include validity counts and percentages for all validation methods, specific to provider and technology.

Wireline Census Block and Street Segment Validation

A spatial selection was performed on Census Block and Street Segment data, either submitted by the provider, or created from submitted address records through a geo-coding/spatial selection process, to derive only those blocks or street segments which intersect polygons in a given validation layer. Counts are recorded as number of unique blocks or unique segments which share geographic area with any given validation layer, compared to the total number of unique blocks submitted by, or created for, a given provider. Percentages are recorded as percentage of the total number of unique blocks or street segments which share geographic area with any given validation layer, compared to the total number of unique blocks submitted by, or created for, a given provider.

Wireless Validation

A spatial selection was performed on Wireless Availability data, either submitted by the provider, or created from tower and antenna location information, to select only those polygons which intersect a given validation layer. Results are recorded as a percentage of the total geographic area of wireless coverage sharing geographic area with any given validation layer compared to the total coverage area submitted by, or created for, a given provider.

Colorado Broadband Data & Development Program

April 1, 2013 Data Delivery Report

For more information about the Colorado Broadband Data and Development Program (CBDDP), please see the websites below:
Colorado Broadband Data Development Program - www.colorado.gov/oit/broadband
National Broadband Map - www.broadbandmap.gov
Colorado Broadband Mapping Application - http://maps.co.gov/ColoradoBroadband

Purpose of this Report

The following report provides details about the data set delivered to the NTIA on April 1, 2013 to support the National Broadband Map and to meet the requirements of the State Broadband Data and Development Program grant to the Governor's Office of Information Technology (OIT). The report describes the various processes used to verify the data set and the results of those processes. It also describes, in general terms, how the CBDDP collects and validates information about broadband availability in the State of Colorado.

Status of Data Collection

The Colorado Broadband Data and Development Program data collection effort began with a third party contractor through a data collection contract signed on March 22, 2010. After the October 2011 data submission, the CBDDP data processing was brought in-house to the Governor's Office of Information Technology. For the April 2013 delivery, a search of current Providers in the state of Colorado was conducted by combining multiple outreach spreadsheets composed by the third party contractor from previous deliveries into a master list. The master list was then compared against our current Provider list, the FCC 477 and FCC 499. The purpose was to find current providers in Colorado, current contact information, and valid proof of broadband services (i.e. website). The master list consisted of more than 150 providers, not currently participating or previously contacted. Half of the providers identified provided only VOIP services, which are not currently included in broadband coverage, leaving 75 providers listed as providing broadband. Only 39 were found to have an active broadband footprint. Of the 39 providers found to be active within Colorado, 24 were interested in participating and submitted data; 2 of the provider's use dial-up or broadband services with speeds not meeting broadband requirements, and 13 providers were not interested in participating.

Since the October 2012 delivery OIT and the outreach efforts of the April 2013 data delivery, OIT contacted the 98 known service providers to contribute data toward the CBDDP, 74 of the Providers participated in previous deliveries. Of the 74 currently participating providers, 39 provided broadband coverage updates; 35 providers declared "no data change" from the last data submission. As outlined above, of the 39 newly identified active Providers from the master list, 24 providers agreed to participate and sent data; the remaining 15 providers were either non-responsive, would not provide data to the CBDDP, or did not meet broadband requirements.

The following table categorizes all possible broadband service providers in Colorado known to the CBDDP, and indicates the status of their participation in the program:

Service Providers	April 1, 2013
Potential Identified Providers	**152**
Data Sets Delivered to NTIA	98
Non Responsive Providers	13
Not a Broadband Provider	2
Will Not Provide Data	2
Out of Business	37

The following table describes service providers included in the current data delivery:

Service Provider Updates	April 1, 2013
New in Data Set	24
Updated Data	39
Responded "No Data Change"	35
Data Sets Delivered to NTIA	**98**

The CBDDP is very pleased with the progress that has been made in promoting speed tests among reporting CAIs. As shown below, 32% (or 1,662 of 5,226) of the data collected for CAIs is from speed tests. The CBDDP has not significantly expanded the number of CAIs submitting speed test information between October 2012 and the current delivery. However, with the hiring of new GIS and planning staff within OIT, we expect to make a more concerted effort to collect additional CAI information or update the data collected last year. The following table shows the number of community anchor institutions that have been identified in the state:

Community Anchor Institutions	April 1, 2013		
	Identified	Collected	Includes Speed Test
Cat. 1 - School K -12	2109	2082	974
Cat. 2 - Library	252	251	14
Cat. 3 - Medical/Healthcare	709	693	142
Cat. 4 - Public Safety	1779	1591	305
Cat. 5 - University/College	55	55	42
Cat. 6 - Other Government	601	546	179
Cat. 7 - Other non-Government	10	8	6
TOTALS	**5515**	**5226**	**1662**

Addresses and names that appear to be duplicates are validated. The CBDDP chooses to report multiple CAIs at the same address as distinct entities. For example, a county sheriff's office and a 911 call center at the same address are reported as two distinct entities.

Validation and Verification Processes for the April 2013 Data Set

Techniques:

1. Automated Validation
2. Analysis of Changes
3. Visual Review
4. Third Party Data Validation
5. Feedback Loop
6. CAI Speed Test Analysis
7. Drive Testing Mobile Coverage Areas
8. FCC Speed Test Validation
9. Crowd Sourcing

1. Automated Validation

The CBDDP has been developing and improving automated validation scripts since its first data delivery in May 2010. The CBDDP runs both the scripts it has developed as well as the script provided by the NTIA on a monthly basis. The data delivery includes documentation demonstrating that the data has passed the NTIA validation script as required.

In addition to testing all of the issues covered by the NTIA script, the CBDDP's automated script:

- Verifies that the Geodatabase has metadata, is in the correct projection, and that the feature classes are properly named
- Verifies all columns are properly named and defined
- Verifies all table value domains are adhered to
- Captures the required information to accurately complete the Records Count and Provider Table tabs for the SBDD Data Package
- Cross references and creates statistical tables of technology type and valid speed combinations for both Service Provider and CAI data
- Compares FCC assigned Frequency Reference Numbers (FRNs) to provider names to ensure consistency across the data set
- Ensures consistency in provider names
- Identifies possible duplicates among CAIs
- Tests all feature classes to ensure they are within the State's boundaries
- Creates a statistical table for all features classes including records details, service provider information and attribution frequencies
- Ensures the data model, business rules and schema are in compliance

2. Analysis of Changes

There are three major types of data changes between the October 2012 delivery and the April 2013 delivery: The addition of new providers; the transfer of broadband services between providers and receiving new data from existing providers. The coverage was updated to reflect the increase or decrease in service, with regards to the aforementioned data changes. The following table shows the percentage change in the number of features from October 2012 to April 2013:

	Census Blocks		Road Segments		Wireless Service		Middle Mile		Address Pts	
	Number of Providers	% Features Changed	Number of Providers	% Features Changed	Number of Providers	% Features Changed	Number of Providers	% Features Changed	Number of Providers	% Features Changed
New Providers	8	100%	6	100%	17	100%	16	100%	1	100%
Received new data	16	39%	17	7%	22	7%	26	2%	1	2%
Re-processed existing data	3	97%	2	6%	0	0%	1	4%	0	0%
No Changes	23	0%	21	0%	22	0%	17	0%	2	0%

3. Visual Review

The CBDDP also routinely reviews the coverage areas for new service providers and those with changes to their coverage areas as part of preparing data for delivery. We found no unusual coverage areas.

4. Third Party Data Validation

OIT compares service provider coverage areas to the following third party data sets: American Roamer, ComSearch, Pitney Bowes, MediaPrints, and SpectrumView. When compared, 20 providers overlapped multiple third party data sets, so in these cases all of the relevant third party data sets were used to validate a single service provider/technology type combination. The CBDDP records comments about coverage area, geometry, and attribution provided for the technology type, and assigns a categorical assessment of the match between the CBDDP data and each third party dataset. This assessment is necessarily subjective as the third party data sets are sometimes very crude in their spatial resolution, making it difficult to make precise comparisons.

5. Feedback Loop

As a routine part of the work flow, the CBDDP gave all service providers the opportunity to review the final geospatial representation of their data in the form of map books. In addition, the OIT team created validation assessments based on the tests described below and communicated results to providers for verification of speed accuracy within the provider coverage area.

6. CAI Speed Test Analysis

There are several issues to consider when comparing speed test data to service provider advertized maximum speeds. Many speed tests do not collect the name of the service provider being tested. In areas where more than one service provider offers varying maximum service speeds, it is not possible to know who is providing the service to the CAI. Also, if a speed test result is directly tied to a certain service provider, it is unknown if the customer has chosen to purchase the maximum available speed offered by the service provider.

The speed test information that the CBDDP collects from CAIs requests the name of the service provider, but of the 1,662 speed tests collected from CAIs, 1,048 of those tests specifically identified the service provider. The CBDDP uses all of the CAI speed tests, regardless of provider information because the test gives a more comprehensive perspective of the comparison between the speeds at each institution and the potential advertised service in their area.

The following table compares the speed tier for the CAI speed test to the maximum advertized speed tier by any service provider for that particular census block or blocks within 150 feet of the test. A similar test also compared the CAI tests to the minimum advertised speed by any providers that reported service in that area, and the table with these results is below as well.

CAI Speed Test Compared to Maximum Download speed by Census Block																
	Speed Test Slower								Same Tier	Speed Test Faster							Total Tests
Number of Speed Tiers Slower or Faster	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	
School K - 12	5	19	70	95	171	124	340	77	8	11	0	0	0	0	0	0	920
Library	2	4	1	0	3	4	0	1	0	0	0	0	0	0	0	0	15
Healthcare	0	17	27	23	34	19	9	14	0	1	0	0	0	0	0	0	144
Public Safety	1	8	42	120	47	30	39	17	0	0	0	0	0	0	0	0	304
University, college	0	1	0	5	1	3	16	4	4	6	2	0	0	0	0	0	42
Other Government	1	5	27	30	25	23	51	12	0	0	0	0	0	0	0	0	174
Other Non-Government	0	1	1	1	3	0	0	0	0	0	0	0	0	0	0	0	6
Totals	**9**	**55**	**168**	**274**	**284**	**203**	**455**	**125**	**12**	**18**	**2**	**0**	**0**	**0**	**0**	**0**	**1605**
Totals	**1573**								**12**	**20**							**1605**

CAI Speed Test Compared to Minimum Download speed by Census Block																	
	Speed Test Slower									Same Tier	Speed Test Faster							Total Tests
Number of Speed Tiers Slower or Faster	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	
School K - 12	1	0	2	7	8	23	39	88	124	164	160	252	145	41	8	5	1	1068
Library	0	0	0	0	1	1	3	3	2	3	1	2	2	0	0	0	0	18
Healthcare	0	0	1	0	2	11	16	34	31	16	28	14	6	3	2	0	0	164
Public Safety	0	1	5	3	5	16	43	41	65	73	44	32	24	7	0	0	0	359
University, college	0	0	0	0	0	0	1	0	5	4	4	10	7	6	5	4	2	48
Other Government	0	0	3	3	5	12	40	20	27	43	24	14	20	7	0	0	0	218
Other Non-Government	0	1	0	0	0	0	0	2	0	2	1	0	0	0	0	0	0	6
Totals	**1**	**2**	**11**	**13**	**21**	**63**	**142**	**188**	**254**	**305**	**262**	**324**	**204**	**64**	**15**	**9**	**3**	**1881**
Totals	**695**									**305**	**881**							**1881**

7. Drive Testing Mobile Coverage Areas

The CBDDP tested the mobile wireless coverage areas reported by the service providers. The CBDDP completed drive testing for over 5,000 miles of roads over one year ago. These tests are still informative when compared to the current data from broadband service providers. The testing followed a test scheme starting with primary test points along major highways, followed by secondary points from one half to one mile away from the primary point to confirm the result of the primary test point. Tests continued until either four secondary points (beyond the primary points) were collected or until at least two of the secondary tests failed (with test speeds of less than 768 Kbps). The primary points were generally 10 to 15 miles apart, and the derived points were clustered

around the primary points within 2 to 3 miles. All tests used commercially available wireless air cards, identical laptops, and the same FCC speed test site. The tests checked only the major national mobile providers and were all performed between March and May of 2011.

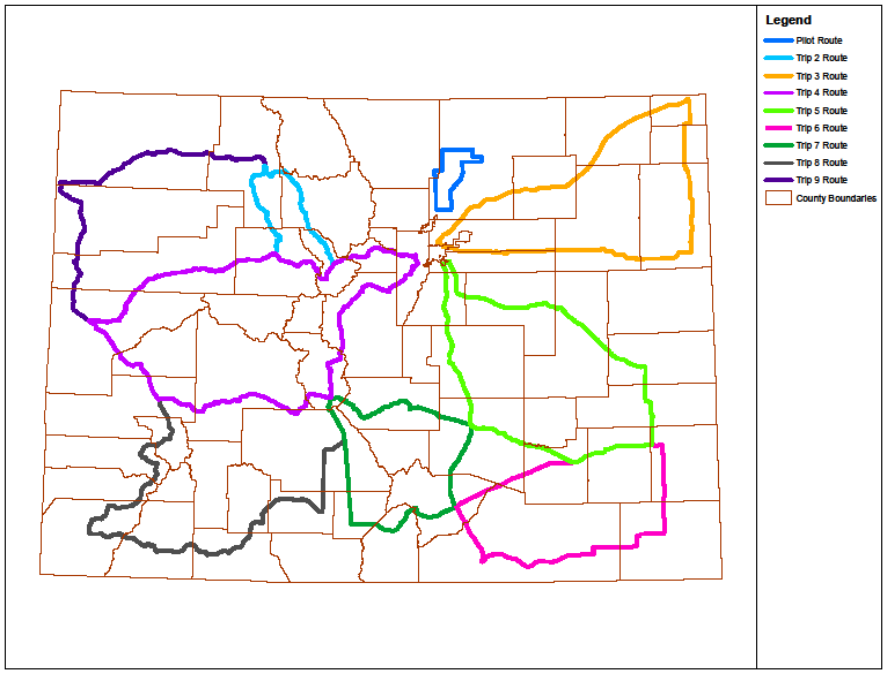


Figure 1: The following graphic is a general depiction of the routes used for the drive testing.

The following table presents the results of these drive tests. The number of test results shown for each provider reflects only the test points that fell within the coverage area submitted to the CBDDP by that service provider.

MOBILE WIRELESS COVERAGE TESTING										
All Points Tested Including Primary and Derived										
Combined Result for Three Providers Tested										
	Tiers Slower					Same Tier	Tiers Faster			Total Tests
Number of Speed Tiers Slower or Faster	< 768 Kbps	-4	-3	-2	-1	0	1	2	3	
	457	41	33	62	70	362	110	1	0	1136
Totals	663					362	111			1136
ATT										
	Tiers Slower					Same Tier	Tiers Faster			Total
Number of Speed Tiers Slower or Faster	< 768 Kbps	-4	-3	-2	-1	0	1	2	3	
	121	1	5	58	67	95	23	0	0	370
Totals	252					95	23			370
Sprint										
	Tiers Slower					Same Tier	Tiers Faster			Total
Number of Speed Tiers Slower or Faster	< 768 Kbps	-4	-3	-2	-1	0	1	2	3	
	143	0	0	4	3	163	23	1	0	332
Totals	150					163	24			337

Verizon									
	Tiers Slower					Same Tier	Tiers Faster			Total
Number of Speed Tiers Slower or Faster	< 768 Kbps	-4	-3	-2	-1	0	1	2	3	
	193	40	28	0	0	104	64	0	0	429
Totals	261					104	64			429

The CBDDP has had discussions with a private vendor of mobile speed testing services to obtain the data they've collected from their devices and application installed in vehicles of local agencies subscribing to their service, significantly increasing the magnitude of mobile speed tests.

8. FCC Speed Test Validation

The FCC speed test information contains two separate data sets: mobile speed tests and terrestrial/fixed wireless speed tests. Both data sets cover a date range from January 2012 to February 2013. The Consumer Broadband Test (CBT) data includes speed tests from homes, businesses, community centers, and other landline or fixed wireless locations. The FCC mobile data includes speed tests collected using the mobile app on a mobile device (i.e. iPhone or Android).

For validation of the FCC CBT speed tests, validation layers were created using census and roads coverage from the final SBDD_TRANSFER.gdb. A layer was created with the maximum available download speed, and a second layer consisted of the minimum available download speed. The census blocks were merged with overlapping buffered roads with same speed tier. The FCC CBT speed test points were then buffered by 150 feet and these buffers were compared to the merged census block and road layers described above.

The first two tables below compare the speed tier of the FCC CBT speed tests to the maximum and minimum advertised speed tiers reported by any non-mobile service provider at each location. The results of the table vary from the October 2012 submission because the previous submission included mobile speed tests which gave an inaccurate representation of FCC validation. The April 2013 FCC CBT validation results are shown below:

FCC CBT Data Speed Tests Compared to Maximum Download Speed																		
	Speed Test Slower								**Same Tier**	**Speed Test Faster**								**Total Tests**
Number of Speed Tiers Slower or Faster	**-8**	**-7**	**-6**	**-5**	**-4**	**-3**	**-2**	**-1**	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	
Maximum	92	212	171	432	470	976	536	198	145	62	33	6	8	0	0	0	0	0	3341
Totals	3087								145	109									3149

FCC CBT Data Speed Tests Compared to Minimum Download Speed																		
	Speed Test Slower								**Same Tier**	**Speed Test Faster**								**Total Tests**
Number of Speed Tiers Slower or Faster	**-8**	**-7**	**-6**	**-5**	**-4**	**-3**	**-2**	**-1**	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	
Minimum	0	6	8	21	51	151	266	336	444	515	769	661	225	31	6	0	o	o	3490
Totals	839								444	2207									3490

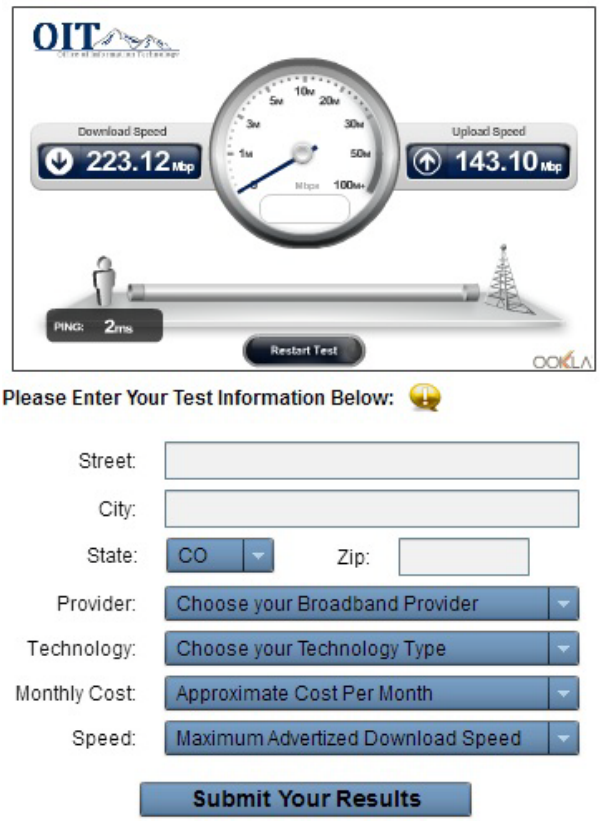
The FCC Mobile Data includes speed tests collected using the Mobile App on a mobile device (i.e. iPhone or Android). The FCC mobile speed tests compare mobile service providers maximum available download speed with the FCC speed tests from mobile providers. The speed test points were buffered 150 feet and a one-to-many join was conducted against all intersecting wireless coverage polygons. The composite table is a comparison of the maximum available download speed across all mobile providers. Tables following the composite are a breakdown by individual providers coverage: AT&T, Leap (Cricket), Nucla-Naturita, Sprint, T-Mobile, Verizon, and Viaero.

FCC Mobile Speed Tests compared to Mobile Services Providers															
		Speed Test Slower					Same Tier	Speed Test Faster							Total Tests
Number of Speed Tiers Slower or Faster	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	
Composite															
	1315	2044	1832	2363	2990	2105	3954	149	25	16	14	0	0	0	16807
Totals	12649						3954	204							16807
AT&T Inc.															
	780	1186	1562	2259	2637	2295	3390	849	1724	77	0	0	1	0	16760
Totals	10719						3390	2651							16760
Leap Wireless International, Inc.															
	0	0	0	0	1099	1740	1540	1998	2543	1738	3618	97	0	1	14374
Totals	2839						1540	9995							14374
Nucla-Naturita Telephone Company															
	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
Totals	2						O	0							2
Sprint Nextel Corporation															
	0	0	697	1131	1709	2363	2680	2345	3566	915	1883	47	1	0	17337
Totals	5900						2680	8757							17337
T-Mobile USA, Inc.															
	1245	1861	1624	2211	2796	1936	3783	233	123	222	3	0	0	0	16037
Totals	11673						3783	581							16037
Verizon Wireless															
	1306	1999	1735	2234	2870	2080	4075	266	139	31	33	0	0	0	16768
Totals	12224						4075	469							16768
Viaero Wireless															
	4	25	21	11	18	5	1	0	0	0	0	0	0	0	85
Totals	84						1	0							85

9. Crowd Sourcing

Colorado broadband speed tests are collected in four ways: a public speed test application, a provider-only speed test application, a CAI speed test, and the Colorado Broadband Mapping Application. The public speed test is located in the CBDDP mapping application (http://maps.co.gov/ColoradoBroadband) and an image of the speed test

is shown below. A direct link speed test application also exists that can be placed on any website, which will help increase availability of the speed test and collect more results than the CBDDP mapping application alone.



Using the application, the general population can conduct speed tests from their home or office. The speed test is provided by an Ookla application, and results are given for download and upload speeds in Mbps. In addition to test results being collected, the user's location, provider name, technology type, and monthly cost are also requested with the test results. The purpose is to collect reports of service from citizens and Community Anchor Institutions in order to compare against provider data. The speed tests are processed quarterly and included in validation for individual providers.

The provider-only speed test application allows providers to submit speed tests during service calls or installations, at which time they are able to test the bandwidth unrestricted by the particular service level subscribed to by the customer. The CBDDP is continuing efforts to collect speed tests using the aforementioned methods, which are used to compare against provider data.

Provider validation efforts continue to improve. For the April 2013 data delivery, the CBDDP used speed tests from the FCC, CAI's, drive tests, public speed test application, and the provider speed test application. Validation against mobile provider coverage uses drive tests and FCC Mobile speed tests points, while validation for wireline and fixed wireless provider coverage uses FCC, CAI's, public, and provider speed tests.

Summary of Process

The CBDDP follows the data collection process outlined on the National Broadband Map website: http://www.broadbandmap.gov/about/technical-overview. A more detailed description of the data processing methods is provided in the Process Guide, which is included with the data submission (CO_Process_Guide_2013_4_01.pdf).

During the first two years of the program, the CBDDP contracted a third party business (Critigen) to perform data processing. Starting with the April 1, 2012 delivery, the CBDDP hired staff and brought this process in-house. The CBDDP will continue with in-house staff through the remainder of the program to October 31, 2014. In-sourcing has improved data quality and increased the number of providers reporting in comparison to previous deliveries. The CBDDP has implemented the following process, which may vary from other state programs.

Data Collection

1. The data gathering process begins by identifying and contacting potential broadband providers. Participation in the program is voluntary, but many providers choose to support our effort.
2. The CBDDP reaches out to providers who have not previously submitted data, in order to create a more comprehensive state dataset.
3. The CBDDP also contacts each currently participating provider to allow them to report data changes or confirm the existing data is still accurate.
4. The CBDDP works closely with providers to help find the best and most accurate method to submit data. We encourage a uniform data submission across all providers, but accept data in various formats dependent on the provider's software limitations.

Data Processing

1. Reference layers include the U.S. Census Bureau 2010 TIGER/Line Shapefile with Census Blocks and Roads.
2. Landline data is divided into three separate categories: census blocks less than two square miles, census blocks greater than two square miles, and service address points
   - For census blocks less than two square miles, the entire census block is presumed to have coverage if a service provider reports broadband service within that census block.
   - For census blocks greater than two square miles, the CBDDP reports service along road segments.
   - Service addresses represent providers who provide service to specific business locations or CAIs, but do not advertise or provide service to residences.
3. When receiving new or updated Provider coverage, data is often submitted as address or point specific information, in which case a 150 foot buffer is drawn around each point and the resulting coverage is used to select the appropriate census blocks and road segments. The CBDDP also implements a network analysis to transform DSLAM (digital subscriber line access multiplexer) locations into a service network area, which is then used to spatially select Census Blocks and Road Segments. The data submitted by the provider is used to collect census blocks and road segments from the reference layers (U.S. Census Bureau 2010 TIGER/Line Shapefile).
4. Wireless data submitted as a service coverage area is added directly to the provider coverage.
5. Wireless data submitted as tower locations is processed using signal propagation software to create a coverage plot.
6. Middle mile locations are reported by the providers using either addresses or coordinates. Central office locations and wireless towers are included in the BB_ConnectionPoint_MiddleMile.
7. Representing typical speeds continues to be an issue, as less than two thirds of the providers report typical speed information.
8. Based on clarifications from the NTIA, the CBDDP did not provide any features in the BB_Service_Overview feature class as more granular speed information was provided in the BB_Service_CensusBlock, BB_Service_RoadSegment and BB_Service_Address feature classes.
9. The CBDDP is not currently collecting pricing information.
10. Various validation methods are implemented to check the data accuracy, as described in "Validation and Verification" section of this document.

Data Submission

1. Before submitting data to the NTIA, the CBDDP compiles the data from each provider into a single dataset using the data model specified by the NTIA.
2. The NTIA then integrates the CBDDP's dataset into the National Broadband Map dataset.

Data Summary and Feature Class Statistical Tables

File Summary	
File Type	**Number of Records**
Total Records in all Files	**644164**
Census Block < 2 sq. miles	**458343**
Street Segments	**176549**
Wireless Areas	**93**
Service Address	**1247**
BB Service Overview	**0**
Community Anchor Institutions	**5515**
Middle Mile	**2417**
Metadata Provided for Geospatial Data	**Yes**

Provider Information	
File Type	**Number of Records**
Number of ISPs Provided	**98**

Census Blocks ‹ 2 sq. miles

Data Type	Code	Data Element	Count	%
Records Details		**Total Records**	458343	
		Census Blocks < 2 sq. miles in State (with & without broadband)	192101	
		Census Blocks > 2 sq. miles in the State (with & without broadband)	8961	
		Total Census Blocks in the State (with & without broadband)	201062	
Services Provider Details		**Number of Distinct Providers**	51	
		Number of Distinct "Doing Business As"	49	
		Number of Distinct FRN	52	
Technology	10	**Asymmetric xDSL**	181615	39.6%
	20	**Symmetric xDSL**	60491	13.2%
	30	**Other Copper Wireless**	78211	17.1%
	40	**Cable Modem-DOCSIS 3.0**	58956	12.9%
	41	**Cable Modem-Other**	27132	5.9%
	50	**Optical Carrier/Fiber**	51938	11.3%
	60	**Satellite**	0	0.0%
	70	**Terrestrial Fixed Wireless-Unlicensed**	0	0.0%
	71	**Terrestrial Fixed Wireless-Licensed**	0	0.0%
	80	**Terrestrial Mobile Wireless**	0	0.0%
	90	**Electrial Power Line**	0	0.0%
	0	**Other**	0	0.0%
Max. Advertised Download Speed	3	**> 768 kps, < 1.5 mbps.**	8895	1.9%
	4	**> 1.5 mbps, < 3 mbps.**	52516	11.5%
	5	**> 3 mbps, < 6 mbps.**	111741	24.4%
	6	**> 6 mbps, < 10 mbps.**	72629	15.8%
	7	**> 10 mbps, < 25 mbps.**	105803	23.1%
	8	**> 25 mbps, < 50 mbps.**	35749	7.8%
	9	**> 50 mbps, < 100 mbps.**	9333	2.0%
	10	**> 100 mbps, < 1 gbps.**	61641	13.4%
	11	**> 1 gbps.**	36	0.0%
Provider Type	1	**Provider**	458343	100%
	2	**Reseller**	0	0.0%
End User Name	1	**Residential**	456184	99.5%
	2	**Governmental**	2159	0.5%

Data Type	Code	Data Element	Count	%
Typical Download Speed	3	**>= 768 kbps. < 1.5 mbps.**	8411	1.8%
	4	**>= 1.5 mbps. < 3 mbps.**	39361	8.6%
	Wired	**>= 3 mbps. < 6 mbps.**	101806	22.2%
	6	**>= 6 mbps. < 10 mbps.**	49745	10.9%
	7	**>= 10 mbps. < 25 mbps.**	78346	17.1%
	8	**>= 25 mbps. < 50 mbps.**	33655	7.3%
	9	**> 50 mbps, < 100 mbps.**	46	0.0%
	10	**> 100 mbps, < 1 gbps.**	23	0.0%
	11	**> 1 gbps.**	0	0.0%
		ZZ "null"	146950	32.1%
Max. Advertised Upload Speed	2	**>200 kps, < 768 kps.**	24781	5.4%
	3	**>= 768 kbps. < 1.5 mbps.**	95799	20.9%
	4	**> 1.5 mbps, < 3 mbps.**	81929	17.9%
	5	**> 3 mbps, < 6 mbps.**	104805	22.9%
	6	**> 6 mbps, < 10 mbps.**	45189	9.9%
	7	**> 10 mbps, < 25 mbps.**	95283	20.8%
	8	**> 25 mbps, < 50 mbps.**	4126	0.9%
	9	**> 50 mbps, < 100 mbps.**	6129	1.3%
	10	**> 100 mbps, < 1 gbps.**	266	0.1%
	11	**> 1 gbps.**	36	0.0%
Typical Upload Speed	2	**>200 kps, < 768 kps.**	39127	8.5%
	3	**> 768 kps, < 1.5 mbps.**	56085	12.2%
	4	**> 1.5 mbps, < 3 mbps.**	64785	14.1%
	5	**> 3 mbps, < 6 mbps.**	83502	18.2%
	6	**> 6 mbps, < 10 mbps.**	41420	9.0%
	7	**> 10 mbps, < 25 mbps.**	24552	5.4%
	8	**> 25 mbps, < 50 mbps.**	1899	0.4%
	9	**> 50 mbps, < 100 mbps.**	23	0.0%
	10	**> 100 mbps, < 1 gbps.**	0	0.0%
	11	**> 1 gbps.**	0	0.0%
		ZZ "null"	146950	32.1%

Street Segment

Data Type	Code	Data Element	Count	%
Record Details		Total Records	176549	
Services Provider Details		Number of Distinct Providers	46	
		Number of Distinct "Doing Business As"	45	
		Number of Distinct FRN	47	
Technology	10	Asymmetric xDSL	86194	48.8%
	20	Symmetric xDSL	15545	8.8%
	30	Other Copper Wireless	6798	3.9%
	40	Cable Modem-DOCSIS 3.0	13478	7.6%
	41	Cable Modem-Other	21097	11.9%
	50	Optical Carrier/Fiber	33437	18.9%
	60	Satellite	0	0.0%
	70	Terrestrial Fixed Wireless-Unlicensed	0	0.0%
	71	Terrestrial Fixed Wireless-Licensed	0	0.0%
	80	Terrestrial Mobile Wireless	0	0.0%
	90	Electrial Power Line	0	0.0%
	0	Other	0	0.0%
Max. Advertised Download Speed	3	> 768 kps, < 1.5 mbps.	15862	9.0%
	4	> 1.5 mbps, < 3 mbps.	38165	21.6%
	5	> 3 mbps, < 6 mbps.	19565	11.1%
	6	> 6 mbps, < 10 mbps.	30164	17.1%
	7	> 10 mbps, < 25 mbps.	48937	27.7%
	8	> 25 mbps, < 50 mbps.	5708	3.2%
	9	> 50 mbps, < 100 mbps.	4707	2.7%
	10	> 100 mbps, < 1 gbps.	13441	7.6%
	11	> 1 gbps.	0	0.0%
Provider Type	1	Provider	176549	100.0%
	2	Reseller	0	0.0%
End User Name	1	Residential	176491	100.0%
	2	Governmental	58	0.0%

Data Type	Code	Data Element	Count	%
Typical Download Speed	3	> 768 kps, < 1.5 mbps.	3921	2.2%
	4	> 1.5 mbps, < 3 mbps.	26414	15.0%
	5	> 3 mbps, < 6 mbps.	12077	6.8%
	6	> 6 mbps, < 10 mbps.	18354	10.4%
	7	> 10 mbps, < 25 mbps.	29309	16.6%
	8	> 25 mbps, < 50 mbps.	1279	0.7%
	9	> 50 mbps, < 100 mbps.	0	0.0%
	10	> 100 mbps, < 1 gbps.	2	0.0%
	11	> 1 gbps.	0	0.0%
		ZZ "null"	85193	48.3%
Max. Advertised Upload Speed	2	>200 kps, < 768 kps.	28691	16.3%
	3	> 768 kps, < 1.5 mbps.	38953	22.1%
	4	> 1.5 mbps, < 3 mbps.	40487	22.9%
	5	> 3 mbps, < 6 mbps.	16989	9.6%
	6	> 6 mbps, < 10 mbps.	26612	15.1%
	7	> 10 mbps, < 25 mbps.	19785	11.2%
	8	> 25 mbps, < 50 mbps.	4920	2.8%
	9	> 50 mbps, < 100 mbps.	111	0.1%
	10	> 100 mbps, < 1 gbps.	1	0.0%
	11	> 1 gbps.	0	0.0%
Typical Upload Speed	2	>200 kps, < 768 kps.	24241	13.7%
	3	> 768 kps, < 1.5 mbps.	20294	11.5%
	4	> 1.5 mbps, < 3 mbps.	25605	14.5%
	5	> 3 mbps, < 6 mbps.	5029	2.8%
	6	> 6 mbps, < 10 mbps.	15200	8.6%
	7	> 10 mbps, < 25 mbps.	985	0.6%
	8	> 25 mbps, < 50 mbps.	0	0.0%
	9	> 50 mbps, < 100 mbps.	2	0.0%
	10	> 100 mbps, < 1 gbps.	0	0.0%
	11	> 1 gbps.	0	0.0%
		ZZ "null"	85193	48.3%

Wireless

Data Type	Code	Data Element	Count	%
Record Details		Total Records	93	
Services Provider Details		Number of Distinct Providers	62	
		Number of Distinct "Doing Business As"	60	
		Number of Distinct FRN	57	
Technology	10	Asymmetric xDSL	0	0.0%
	20	Symmetric xDSL	0	0.0%
	30	Other Copper Wireless	0	0.0%
	40	Cable Modem-DOCSIS 3.0	0	0.0%
	41	Cable Modem-Other	0	0.0%
	50	Optical Carrier/Fiber	0	0.0%
	60	Satellite	5	0.0%
	70	Terrestrial Fixed Wireless-Unlicensed	49	42.1%
	71	Terrestrial Fixed Wireless-Licensed	20	29.8%
	80	Terrestrial Mobile Wireless	19	28.1%
	90	Electrial Power Line	0	0.0%
	0	Other	0	0.0%
Max. Advertised Download Speed	3	> 768 kps, < 1.5 mbps.	15	24.6%
	4	> 1.5 mbps, < 3 mbps.	10	17.5%
	5	> 3 mbps, < 6 mbps.	21	33.3%
	6	> 6 mbps, < 10 mbps.	22	24.6%
	7	> 10 mbps, < 25 mbps.	25	0.0%
	8	> 25 mbps, < 50 mbps.	0	0.0%
	9	> 50 mbps, < 100 mbps.	0	0.0%
	10	> 100 mbps, < 1 gbps.	0	0.0%
	11	> 1 gbps.	0	0.0%
Spectrum	1	800 Mhz Spectrum Used	3	3.5%
	2	700 Mhz Spectrum Used	8	12.3%
	3	1900 Mhz Spectrum Used	6	8.8%
	4	1700 Mhz Spectrum Used	7	10.5%
	5	2500 Mhz Spectrum Used	5	7.0%
	6	Unlicensed Spectrum Used	51	49.1%
	7	Specialist Mobile Radio Service	4	8.8%
	8	Wireless Communication Service	4	0.0%
	9	Satilite	5	0.0%

Data Type	Code	Data Element	Count	%
Typical Download Speed	2	>200 kps, < 768 kps.	0	0.0%
	3	> 768 kps, < 1.5 mbps.	17	22.8%
	4	> 1.5 mbps, < 3 mbps.	6	10.5%
	5	> 3 mbps, < 6 mbps.	13	22.8%
	6	> 6 mbps, < 10 mbps.	10	7.0%
	7	> 10 mbps, < 25 mbps.	3	0.0%
	8	> 25 mbps, < 50 mbps.	0	0.0%
	9	> 50 mbps, < 100 mbps.	0	0.0%
	10	> 100 mbps, < 1 gbps.	0	0.0%
		ZZ "null"	44	36.8%
Max. Advertised Upload Speed	2	>200 kps, < 768 kps.	15	29.8%
	3	> 768 kps, < 1.5 mbps.	27	35.1%
	4	> 1.5 mbps, < 3 mbps.	18	14.0%
	5	> 3 mbps, < 6 mbps.	12	14.0%
	6	> 6 mbps, < 10 mbps.	8	7.0%
	7	> 10 mbps, < 25 mbps.	13	0.0%
	8	> 25 mbps, < 50 mbps.	0	0.0%
	9	> 50 mbps, < 100 mbps.	0	0.0%
	10	> 100 mbps, < 1 gbps.	0	0.0%
	11	> 1 gbps.	0	0.0%
Typical Upload Speed	2	>200 kps, < 768 kps.	15	19.3%
	3	> 768 kps, < 1.5 mbps.	20	33.3%
	4	> 1.5 mbps, < 3 mbps.	5	3.5%
	5	> 3 mbps, < 6 mbps.	4	5.3%
	6	> 6 mbps, < 10 mbps.	2	1.8%
	7	> 10 mbps, < 25 mbps.	3	0.0%
	8	> 25 mbps, < 50 mbps.	0	0.0%
	9	> 50 mbps, < 100 mbps.	0	0.0%
	10	> 100 mbps, < 1 gbps.	0	0.0%
		ZZ "null"	44	36.8%

Community Anchor Institution

Data Type	Code	Data Element	Count	%
Record Details		Total Records	5515	
Anchor Category	1	School-K through 12	2109	38.2%
	2	Library	252	4.6%
	3	Medical/healthcare	709	12.9%
	4	Public safety	1779	32.3%
	5	University, college, other post-secondary	55	1.0%
	6	Other community support-/gov't	601	10.9%
	7	Other community support-non-/gov't	10	0.2%
Technology	10	Asymmetric xDSL	1216	22.0%
	20	Symmetric xDSL	20	0.4%
	30	Other Copper Wireless	1934	35.1%
	40	Cable Modem-DOCSIS 3.0	5	0.1%
	41	Cable Modem-Other	146	2.6%
	50	Optical Carrier/Fiber	1787	32.4%
	60	Satellite	14	0.3%
	70	Terrestrial Fixed Wireless-Unlicensed	27	0.5%
	71	Terrestrial Fixed Wireless-Licensed	77	1.4%
	80	Terrestrial Mobile Wireless	0	0.0%
	90	Electrial Power Line	0	0.0%
	0	Other	0	0.0%
		ZZ "null"	289	5.2%
Max. Advertised Download Speed	1	< 200 kps.	0	0.0%
	2	>200 kps, < 768 kps.	0	0.0%
	3	> 768 kps, < 1.5 mbps.	231	4.2%
	4	> 1.5 mbps, < 3 mbps.	1707	31.0%
	5	> 3 mbps, < 6 mbps.	992	18.0%
	6	> 6 mbps, < 10 mbps.	433	7.9%
	7	> 10 mbps, < 25 mbps.	1430	25.9%
	8	> 25 mbps, < 50 mbps.	213	3.9%
	9	> 50 mbps, < 100 mbps.	67	1.2%
	10	> 100 mbps, < 1 gbps.	81	1.5%
	11	> 1 gbps.	72	1.3%
		ZZ "null"	289	5.2%

Data Type	Code	Data Element	Count	%
Max. Advertised Upload Speed	1	< 200 kps.	0	0.0%
	2	>200 kps, < 768 kps.	214	3.9%
	3	> 768 kps, < 1.5 mbps.	666	12.1%
	4	> 1.5 mbps, < 3 mbps.	1806	32.7%
	5	> 3 mbps, < 6 mbps.	1029	18.7%
	6	> 6 mbps, < 10 mbps.	446	8.1%
	7	> 10 mbps, < 25 mbps.	782	14.2%
	8	> 25 mbps, < 50 mbps.	97	1.8%
	9	> 50 mbps, < 100 mbps.	53	1.0%
	10	> 100 mbps, < 1 gbps.	61	1.1%
	11	> 1 gbps.	72	1.3%
		ZZ "null"	289	5.2%
Y/N Broadband Service	Y	Yes-Subscribers to Service	5226	94.8%
	N	No-Does Not Subscribers to Service	289	5.2%
	U	Unknown	0	0.0%
Lat/Long Accuracy	1	Lat/Long thT Flls within the State	5515	
	2	Total Lat/Long	5515	100%
Anchor Names		Total Count Anchors Names	5515	
		Disticnt Count of Anchor Names	5368	

			Count	BB Info
Community Anchor Institution Category Count with Broadband Information	1	School-K through 12	2109	2082
	2	Library	252	251
	3	Medical/healthcare	709	693
	4	Public safety	1779	1591
	5	University, college, other post-secondary	55	55
	6	Other community support-/gov't	601	546
	7	Other community support-non-/gov't	10	8
		Totals	5515	5226
Public WIFI	1	Y	0	
	2	N	5515	

Middle Mile

Data Type	Code	Data Element	Count	%
Record Details		Total Records	2417	
Services Provider Details		Number of Distinct Providers	60	
		Number of Distinct "Doing Business As"	57	
		Number of Distinct FRN	56	
Ownership	0	Owned	1467	60.7%
	1	Leased	950	39.3%
Facility Capacity	1	Multiple T1's and less than 40 mbps.	816	33.8%
	2	Greater than 40 mbps. and less than 150 mbps.	173	7.2%
	3	Greater than 150 mbps. and less than 600 mbps.	110	4.6%
	4	Greater than 600 mbps. and less than 2.4 gbps.	45	1.9%
	5	Greater than 2.4 gbps. and less than 10 gbps.	0	0.0%
	6	Greater than 10 gbps	1273	52.7%

Data Type	Code	Data Element	Count	%
Facility Type	1	Fiber	1473	60.9%
	2	Copper	4	0.2%
	3	Hybrid Fiber Coax (HFC)	3	0.1%
	4	Wireless	937	38.8%
		N/A "null"		0.0%
Lat / Long		# of Lat/Long in State	1151	100%
		Total Lat/Long	1151	
Elevation		Number of Data Points	634	
		Lowest Elevation	5	
		Highest Elevation	350	

Services Providers				Census	Roads	Wireless	Mid Mile
	Broadband Services Providers Submitted						
#	FRN	Company Name	Doing Business As				
1	0004311627	Agate Mutual Telephone Cooperative Association	Prairie Networks, LLC	28	214		10
2	0003777927	Antilles Wireless, LLC	USA Communications	232		1	
3	0003766532	New Cingular Wireless Services, Inc	AT&T Corp, Inc.			5	1
4	0014860522	Baja Broadband Holding Company	Baja Broadband Operating Company, LLC	3201	280		
5	0003728292	Beulahland Communications, Inc.,	Beulahland Communications, Inc.,			2	1
6	0003723509	Big Sandy Telecom, Inc	Big Sandy Telecom, Inc	351	2039		18
7	0003754652	Bijou Telephone Co-op Association, Inc.	Bijou Telephone Cooperative Association, Inc.	1005	1082	2	4
8	0003766201	Blanca Telephone Company	Blanca Telephone Company	2922	3252		
9	0017108747	Brainstorm Internet	Brainstorm Internet			1	45
10	0014778781	BySky, Inc.	BySky, Inc.			1	
11	0006980866	Chase 3000, Inc.	Chase 3000, Inc.			1	2
12	0018589259	Cardinal Broadband, LLC	Cardinal Broadband, LLC	35			
13	0019746445	CAP Cable	USA Communications	628	5	1	
14	0018626853	CenturyTel, Inc.	CenturyTel, Inc.	94113	54877		
15	0001621127	City of Glenwood Springs	City of Glenwood Springs, Community Broadband Network	110	1	1	
16	0017775628	Clear Wireless, LLC	Clearwire			1	
17	0001614015	Colorado Mobile Inet, LLC	Colorado Mobile Inet, LLC			1	22
18	9999	Colorado Wireless Exchange Cooperative	Colorado Wireless Exchange Cooperative			1	3
19	0002147098	Columbine Telecom Company	FairPoint Communications	516	1646	1	20
20	0004441663	Comcast Cable Communications, LLC	Comcast	59384	13478		
21	0007001977	CSC Holdings, LLC	Bresnan Communications	15116	6354		
22	0001617281	Delta County Tele-comm, Inc.	TDS Telecom	827	844		1
23	0020233508	DirectLink, LLC	DirectLink, LLC			2	77
24	0017195017	Diverse Datum, Inc	Diverse Datum, Inc			1	28
25	0001629781	Dubois Telephone Exchange, Inc.,	DTE	53	130	1	4
26	0013339973	Eagle Communications, Inc.	Eagle Cable TV And Internet	237	29		1
27	0004317731	Eastern Slope Rural Telephone Association, Inc.	Eastern Slope Rural Telephone Association, Inc.	2220	7449		12
28	0020146056	Elevated Access LLC	Elevated Access LLC	23	1	3	5
29	0003767852	Eschelon Telecom of Colorado, Inc.	Integra Telecom	81750	20735		
30	0017509779	Estes Valley Networks, Inc.	Estes Valley Networks, Inc.			1	3
31	0019436757	Falcon Broadband, Inc	Falcon Broadband, Inc	276	12		
32	0004338489	Farmers Telephone Company	Farmers Telephone Company	180	921		12
33	0005059092	Farmers Telecommunications	Farmers Telecommunications	682	111	2	1
34	0007719719	FastTrack Communications, Inc	FastTrack Communications, Inc	10915	18179		
35	0015575285	Front Range Internet, Inc.	Front Range Internet, Inc.	5794	97		1
36	0016084683	Grand County Internet Services, Inc.	Grand County Internet Services, Inc.			1	34
37	0000824224	Grand Valley Telecommunications, Inc.	Grand Valley Telecommunications, Inc.	1171	10	1	7

38	0004381380	Great Plains Communications, Inc.	Great Plains Communications, Inc.	5	2		
39	0001616200	Haxtun Telephone	Haxtun	1023	1327		
40	0019794643	HighSpeed4U	HighSpeed4U			1	24
41	0018483073	Hughes Network Systems, LLC	HughesNet			1	
42	0015866460	Internet Colorado	Internet Colorado	364	54	1	12
43	0018706002	Inventive Wireless of Nebraska, LLC	Vistabeam			1	
44	0007651219	iLOKA Inc	Microtech-tel	35614	20380		
45	0014175673	JAB Broadband	Skybeam, Inc.			1	399
46	0003766623	Jade Communications, LLC	Jade Communications, LLC			1	16
47	0002748044	James Cable LLC	CommuniComm Services	692	3		1
48	0003728284	J.e.d. Enterprises, Inc.	J.e.d. Enterprises, Inc.	203	1355		16
49	0004671764	Kentec Communications Inc	Kentec Communications Inc	737	1791	1	35
50	9999	Kremmling Technology Services	Kremmling Technology Services			1	3
51	0005030200	Live Wire Networks, Inc.	Live Wire Networks, Inc.	293		1	
52	0003723822	Level 3 Communications, LLC	Level 3 Communications, LLC				418
53	0002963528	Leap Wireless International, Inc.	Cricket Communications, Inc.,			2	
54	0018769547	Magnolia Road Internet Coop	MRIC			2	20
55	0003753787	MegaPath Corporation MegaPath Corporation	MegaPath Corporation	127088	4713		3
56	0016631087	Mountain Computer Wizards, Inc.	Mountain Computer Wizards, Inc.			1	5
57	9999	Mountain Broadband, LLC	Mountain Broadband			1	18
58	0001610815	Mountain Village Cable TV	Mountain VIllage Owners Association	61			
59	9999	Nedernet, Inc.	Nedernet, Inc.			1	15
60	0004312187	Nucla-Naturita Telephone Company	Nucla-Naturita Telephone Company	297	332	2	
61	0004311809	Nunn Telephone Company	Nunn Commuicatio, LLC	398	1358		1
62	9999	OurayNet	OurayNet			1	13
63	0014699953	Peetz Communications, LLC	Peetz Cooperative Telephone Company	94	176	1	
64	0016286825	PCI Broadband	PCI Broadband			4	
65	0004314316	Phillips County Telephone Company	PCTelecom	585	757	2	3
66	0001615889	Plains Cooperative Telephone Association, Inc.,	Plains Cooperative Telephone Association, Inc.,	1113	3298	1	52
67	0011953643	Plains.Net	Premier Systems Unlimited, Inc			1	27
68	0016084675	Rebeltec Communications, LLC	Rebeltec Communications, LLC	91		2	26
69	0005059092	Rico Telephone Company	Rico Telephone Company	78	93		3
70	0014705602	Roggen Telephone Cooperative Company	Roggen Telephone Enterprises, Inc.			1	2
71	0001615665	Rye Telephone Company, Inc.	ghValley.net	894	2641	1	2
72	0005061775	San Isabel Telecom, Inc.	San Isabel Telecom, Inc.	1360	634	1	5
73	0004310769	S&T Telephone Coop Association. Inc.	S&T Telephone Coop Assoc Inc	22	29		
74	0016136327	SECOM	SECOM			2	28
75	0018756155	Skycasters, LLC	Skycasters			1	
76	9999	Skywerx Industries, LLC	Skywerx Industries, LLC			1	
77	0017163304	Slopeside Internet, LLC	Slopeside Internet, LLC			3	

78	0005070933	South Park Telephone Company, LLC	ghValley.net			2	1
79	0003774593	Sprint Nextel Corporation	Sprint			2	1
80	0005087457	StarBand Communications Inc.	StarBand Communications Inc.			1	
81	0015021066	Stelera Wireless, LLC	Stelera Wireless, LLC			1	28
82	0001616390	Strasburg Telephone Company	TDS Telecom	111	176		1
83	0003723236	Sunflower Telephone Company	FairPoint Communications	289	531		12
84	0006945950	T-Mobile USA, Inc.	T-Mobile			3	7
85	0013430244	Time Warner Cable	Time Warner Cable	925	859		
86	0004351086	tw telecom inc.	tw telecom inc.	1320	5		2
87	0005200067	Uintah Basin Electronic Telecommunications	Strata Networks	1358	467	1	
88	0003290673	Verizon Wireless	Verizon Wireless			4	
89	0015360456	Viaero Wireless	Viaero Wireless			1	
90	0007843766	ViaSat	ViaSat Communications			2	
91	0020647715	Vision Wireless Communications	Vision Wireless Communications			1	19
92	0001616192	Wiggins Telephone Association	Wiggins Telephone	720	3769		1
93	0006275945	XO Communications, LLC	XO Communications Services, Inc. (Affiliated Entity)	839	53		
94	0015331689	Zayo Enterprise Networks, LLC	Zayo Enterprise Networks, LLC				847
95	0018186395	Zero Error Networks, LLC	Zero Error Networks, LLC			1	19
96	0012579652	Zirkel Wireless, LLC	Zirkel Wireless, LLC			3	20
97	0019898303	Cogent Communications, Inc.	Cogent Communications, Inc.	43 Service Address			
98	0014817357	Unite Private Networks, LLC	Unite Private Networks	516 Service Address			
na	0003723822	Level 3 Communications, LLC	Level 3 Communications, LLC	475 Service Address			
na	0015331689	Zayo Enterprise Networks, LLC	Zayo Enterprise Networks, LLC	213 Service Address			

Distinct Speed Tiers Provided

	Technology Codes	Allowable Down	Allowable Up
10	Asymmetric xDSL	3 to 10	2 to 9
20	Symmetric xDSL	3 to 9	2 to 9
30	Other Copper Wireless	3 to 11	2 to 11
40	Cable Modem-DOCSIS 3.0	3 to 10	2 to 7
41	Cable Modem-Other	3 to 7	2 to 7
50	Optical Carrier/Fiber to End User	3 to 11	2 to 11
60	Satellite	3 to 5	2 to 4
70	Terrestrial Fixed Wireless-Unlicensed	3 to 7	2 to 7
71	Terrestrial Fixed Wireless-Licensed	3 to 7	2 to 7
80	Terrestrial Mobile Wireless	3 to 7	2 to 7
90	Electric Power Lines	3 to 5	2 to 5
0	All Other	3 to 11	2 to 11

Speed Tier Codes	
1	< 200 kps.
2	>200 kps, < 768 kps.
3	> 768 kps, < 1.5 mbps.
4	> 1.5 mbps, < 3 mbps.
5	> 3 mbps, < 6 mbps.
6	> 6 mbps, < 10 mbps.
7	> 10 mbps, < 25 mbps.
8	> 25 mbps, < 50 mbps.
9	> 50 mbps, < 100 mbps.
10	> 100 mbps, < 1 gbps.
11	> 1 gbps.

Maximum Advertised Speed

Technology	Download	Upload	Freq.
10	3	2	327
10	3	3	4845
10	4	2	27495
10	4	3	20553
10	5	2	14280
10	5	3	11047
10	6	2	2654
10	6	3	27435
10	6	4	1181
10	6	5	3
10	6	6	9669
10	7	3	33993
10	7	4	73641
10	7	5	272
10	7	7	1835
10	8	4	11
10	8	5	11018
10	8	7	22030
10	8	8	293
10	9	7	4303
10	9	8	924
20	3	2	215
20	3	3	372
20	4	4	6768
20	5	3	2
20	5	5	8656
20	6	6	53466
20	7	7	3831
20	8	8	2726
30	3	2	624
30	3	3	1137
30	4	4	2969

Typical Speed

Technology	Download	Upload	Freq.
10	3	2	7317
10	3	3	4411
10	4	2	29536
10	4	3	19650
10	5	2	22961
10	5	3	13264
10	6	2	2575
10	6	3	10026
10	7	3	27268
10	7	4	70819
10	8	5	11018
10	8	7	22030
10	9	8	46
10	ZZ	ZZ	26888
20	3	3	601
20	4	4	13899
20	5	5	1109
20	6	6	55436
20	7	7	2224
20	8	8	1799
20	ZZ	ZZ	968
30	3	3	3
30	4	2	37
30	4	4	2653
30	5	5	76379
30	6	4	22
30	6	6	36
30	7	5	2
30	7	6	1099
30	7	7	451
30	8	8	54
30	ZZ	ZZ	4273

Maximum Advertised Speed					Typical Speed			
Technology	Download	Upload	Freq.		Technology	Download	Upload	Freq.
30	5	4	5		40	ZZ	ZZ	72434
30	5	5	76881		41	5	2	93
30	6	4	37		41	7	2	772
30	6	6	134		41	7	4	266
30	7	6	1121		41	ZZ	ZZ	47098
30	7	7	2020		50	5	2	77
30	8	6	2		50	6	3	4
30	8	8	79		50	7	3	1152
40	10	7	72232		50	7	4	2731
41	3	2	6317		50	7	5	23
41	3	3	10639		50	7	6	49
41	4	2	695		50	7	7	799
41	4	3	4		50	8	7	33
41	4	4	11		50	10	9	25
41	5	2	93		50	10	10	516
41	5	3	5		50	11	11	475
41	5	4	2		50	ZZ	ZZ	80738
41	6	3	739		60	3	2	2
41	6	4	1		60	4	2	1
41	6	5	61		60	ZZ	ZZ	2
41	6	6	1486		70	3	2	2
41	7	2	772		70	3	3	3
41	7	3	22544		70	4	3	3
41	7	4	2050		70	4	4	1
41	7	7	668		70	5	2	3
41	8	8	2344		70	5	3	3
50	3	3	281		70	5	4	1
50	4	4	32186		70	5	5	1
50	5	5	20335		70	6	4	2
50	6	3	4		70	6	5	2
50	6	6	5923		70	6	6	2
50	7	3	1152		70	7	7	2
50	7	4	3554		70	ZZ	ZZ	24
50	7	5	4568		71	3	2	1
50	7	7	2719		71	3	3	4
50	8	7	1152		71	4	2	1
50	8	8	1802		71	5	2	1
50	9	7	1871		71	5	3	2
50	9	8	878		71	6	3	1
50	9	9	6064		71	6	4	1
50	10	7	2407		71	7	7	1
50	10	9	176		71	ZZ	ZZ	8
50	10	10	267		80	3	2	4

Maximum Advertised Speed			
Technology	Download	Upload	Freq.
50	11	10	35
50	11	11	1248
60	4	2	1
60	5	3	2
60	7	4	1
60	7	5	1
70	3	2	1
70	3	3	3
70	4	3	3
70	4	4	2
70	5	2	2
70	5	3	4
70	5	4	2
70	5	5	2
70	6	2	1
70	6	3	2
70	6	4	4
70	6	5	3
70	6	6	4
70	7	3	1
70	7	4	2
70	7	5	2
70	7	6	1
70	7	7	10
71	3	2	1
71	3	3	4
71	4	2	1
71	5	2	1
71	5	3	3
71	5	5	1
71	6	3	1
71	6	4	1
71	6	5	1
71	6	6	3
71	7	7	3
80	3	2	6
80	4	2	1
80	4	3	2
80	5	3	1
80	5	4	3
80	6	4	2
80	7	3	1
80	7	4	1
80	7	5	2

Typical Speed			
Technology	Download	Upload	Freq.
80	3	3	1
80	5	3	2
80	6	3	1
80	6	5	1
80	ZZ	ZZ	10

CT Broadband Mapping

Data Processing Report

Supplement

Submission 7

March 28, 2013

CONNECTICUT PROGRAM OVERVIEW

In response to the Notice of Funds Availability published in the Federal Register on July 8, 2009 (NOFA), the State of Connecticut Department of Public Utility Control (CT DPUC) submitted a grant application for consideration under the National Telecommunications and Information Administration's (NTIA) State Broadband Initiative Grant Program (SBI), for broadband mapping. The CT DPUC, pursuant to Executive Order 32-A, was designated as the single Connecticut state entity eligible to apply for funds under this program.

In July of 2011, the CT DPUC was merged with the CT Department of Environmental Protection to form a new agency called the Department of Energy and Environmental Protection (CT DEEP). CT DEEP will now be the lead agency coordinating with NTIA on this program.

The State has long been committed to broadband delivery and enhanced use as a fundamental goal. The State has developed a planning strategy to marshal the State's resources and stakeholders and establish Connecticut as a leader in broadband usage, in addition to being a leader in "e-Government" and other broadband-dependent endeavors.

The State entered its SBI initiative not possessing any data related to broadband service, availability, or infrastructure that could readily support the requirements of the Broadband Data and Development grant program. Due to technical considerations, DEEP has partnered with Applied Geographics Inc., and subcontractor Sanborn, to support the data collection and mapping efforts.

So far CT has been very successful in acquiring the requested information from the broadband service providers, and is utilizing this information on our own http://CT.gov/Broadband website as well as providing the needed information up to NTIA to support the national map.

SPRING 2013 SUBMISSION OVERVIEW

According to both our research and lists provided to use by NTIA, there was the potential for CT to have up to 143 broadband providers:

We contacted every provider on this master list.

50 Companies stated they do not provide any type of broadband service in CT. Many of these are either national carriers without a CT presence, or they file 477 reports because they provide VOIP or Video Teleconference services (but not broadband).

360 Networks
8x8, Inc.
Accessline Communications Corporation
Acecape Innovative Networks
AlphaStar
American Fiber Network, Inc.

American Fiber Systems, Inc.
Apptix, Inc
Aptela, Inc
Bellsouth Long Distance, Inc.
Broadcore, Inc.
CIMCO Communications, Inc.
Custom Network Solutions
Cybershore
Echostar
Global Crossing North America, Inc.
GlobalPhone Corp.
GreatCall, Inc
Hickory Tech Corporation
i2 Telecom International, Inc
IDT Corporation
inContact, Inc
InPhonex.com, LLC
Intra Global Communications Inc.
IP Communications, LLC
ITC^DELTACOM Communications
Kosmaz Technologies LLC
M5 Networks, Inc
Matrix Telecom, Inc
New Global Telecom, Inc
Ooma, Inc.
Phone.com, LLC
Qwest Interprise America, Inc.
RCN Corporation
RingCentral, Inc.
Sage Telecom, Inc
SBC Long Distance, LLC
SkyTerra LP
SkyWay, USA
Software Cellular Network Ltd.
Stella Communications
Tata Communications (America) Inc.
Telefonica Data Corp SA
Telefonica USA, Inc.
University Corporation For Advanced Internet Devel
VoiceINC.COM Corporation
VoIPnet Technologies
VoIPStreet, Inc.
Vonage Holdings Corp
Zayo Enterprise Networks, LLC

23 Company names turned out to be a DBA or legal holding names for another firm that is listed in another category. So these duplicates were dropped from our list.

A-R Cable Investments, Inc.
AT&T Corp.
AT&T Services, Inc.
Broadwing Communications, LLC
Cablevision Lightpath CT
Cablevision Systems Corporation
Cellco Partnership
COMCAST CABLE COMMUNICATIONS, INC
Connecticut DataNet, LLC. dba Lightower Fiber Netw
DataNet Communications Group, Inc.
Deutsche Telekom AG
DSLnet Communications, LLC
DSLnet Communications, LLC (Megapath)
Enventis Telecom Inc.
Harron Communications LP
Hudson Valley DataNet, LLC.
Hughes Communications, Inc.
New Cingular Wireless Services, Inc.
Saturn Telecommunications Services, Inc
Verizon Business Global LLC dba Verizon Business
Verizon Communications Inc.
WilTel Communications Group, LLC
Yipes Holdings, Inc

34 Companies reported that they are strictly resellers (which we are not including in our submission).

ACN Communication Services, Inc
Airespring, Inc.
American Fiber Network, Inc.
Bandwidth.com, Inc
BCN Telecom, Inc.
BullsEye Telecom, Inc.
Caused Based Commerce Incorporated
Cypress Communications, LLC
Direct TV
Dish Network
Earthlink
Ernest Communications, Inc.
Fionda VOIP, LLC
Granite Telecommunications LLC
Lightyear Network Solutions LLC
Metropolitan Telecommunications Holding Company
New Edge Holding Company
One Communications Corporation
PAETEC Communications, Inc.

Prescient Worldwide
Proximiti Communications
Reallinx, Inc
Smart Choice Communications, LLC
Stage 2 Networks, LLC
Telefonica Data Corp SA
Telefonica USA, Inc.
Telesphere Networks Ltd
Trans National Communications International
Transbeam Inc.
TW Telecom Data Services
VCOM Solutions, Inc
Wholesale Carrier Services
Wholesale Carrier Services, Inc
Windstream

7 Companies may be broadband providers, but either they indicated they are not willing to provide data, or were completely unresponsive to multiple attempts of contacting them.

Advanced Corporate Networking, Inc.
DSCI Communications, Inc.
Great Auk Wireless (GAW Communication)
Interglobe Communications Inc
Meriplex Communications, Ltd.
Spot On Networks
Universal Connectivity

15 Broadband providers submitted new or updated data:

AT&T Inc.
Charter Communications
Clearwire
Comcast
Cox Communications
CSC Holdings, Inc.
Fibertech Networks, LLC
HNS License Sub, LLC
Level 3 Communications, LLC
MegaPath/Covad Communications Group, Inc.
Sidera Networks
Sprint Nextel Corporation
T-Mobile USA, Inc.
Verizon New York Inc.
Verizon Wireless

11 Broadband providers informed us that there were no changes to their service area or did not provide an updated dataset for this submission:

Broadview Networks, Inc.
Cogent Communications, Inc.

Connecticut Educational Network /CEN
Groton Utilities
Light Tower Fiber Long Island, LLC
METROCAST COMMUNICATIONS OF CT
Reliance Globalcom Services, Inc.
Skycasters
StarBand Communications, Inc.
ViaSat/Wild Blue Communications, Inc.
XO Holdings, Inc.

For the Spring 2013 submission (S7), roughly 58% of the state providers submitted either entirely new or significantly revised data sets. This is slightly down from the last submission where approximately 60% of the providers submitted either entirely new of significantly revised data sets.

In general, the submission 7 processes followed the same basic approach that was used in earlier submissions. This document summarizes the following:

- Submission 7 Processing Assumptions
- Reference Data Creation
- Processing of new provider data
- Quality control checks
- Improved validation techniques
- NTIA quality control scripts
- NTIA Submission Data Model Schema Changes

SUBMISSION 7 PROCESSING ASSUMPTIONS

Based on NTIA feedback and information provided in NTIA webinar sessions, the submission 7 data processing workflow is based on the following assumptions to meet NTIA submission requirements.

1. All census blocks and road segments are mapped based on 2010 census data set.
2. For this submission we again requested actual speed data from the providers in addition to max advertised and typical speeds. Approximately 80% of the providers provided this data to us. This data was then populated into an internal data model, was used to support validation efforts, and is being used to enhance the functionality of the state broadband web site.
3. Due to our NDA restrictions, last mile points are still not being submitted to NTIA.
4. Due to NDA restrictions and our inability to accurately flag service by “category of end user”, address points were not submitted to NTIA for any commercial provider.
5. Some providers did not submit middle mile elevation. Wherever possible, we went back to providers to obtain their middle mile elevation information, but it is not available for every record. Due to changes in the NTIA check script, when a provider provided us with and elevation that was negative (below grade level), this value was changed to zero so the check script would not report a failure even though we feel this is inaccurate.
6. Terrestrial Mobile Wireless and Terrestrial Fixed Wireless (licensed and unlicensed) were again treated as wireless coverage and were delivered as a shape. In cases where a provider served

the same technology and spectrum with different speeds, overlapping areas were removed and the higher speed was assigned. The exception to this rule is where a provider is using the same technology and spectrum, but delivering different services speeds such as 3G and 4G. In this case a continuous polygon is being created that represents the area that is offered for both 3G and 4G even if this polygons overlap.

7. If a cable based wireline provider can provide both DOCSIS 2.0 and DOCSIS 3.0 service to the same area, the block or road was listed only once with a technology code of 40.
8. Providers were only willing to indicate on a general level if they severed business, residential or both, so we did not get any providers that broke down the type of service by block. Only if the provider stated they only serve business to business customers did we fill in the "category of end user" with a code of 2, otherwise this field was left blank.
9. The submission 7 Provider data model is currently based on the NTIA December 2012 data package.

SUBMISSION 7: REFERENCE DATA

This section describes the reference data used in submission 7.

BLOCK REFERENCE SETUP

For Submission 7, Census 2010 data was utilized. The data was set up as follows:

- Block size (AREA) is calculated combining the 2010 land area (ALAND) and water area (AWATER)
- AREA is converted from square meters to square miles to calculate square mileage (SMI).
- If the SMI of a block is less than or equal to 2, then the less than or equal to 2 square mile indicator (LE2SMI) is set to true.

ROAD REFERENCE SETUP

2010 Tiger Line IDs (TLID) were used for data processing in S7. The data was set up as follows:

- The GT2SMI (Greater Than 2 Square Mile) indicator is set to True when:
  - The 2010 road segment is completely within a block that is NOT less than 2 square miles
- Only minimum and maximum address ranges and a single zip code for each road segment is maintained.

In the final stages of processing this submission we noticed that some providers are delivering street segments that appear to be new roads that have been constructed since the 2010 data was collected, but they are not in the Census 2010 geometry data. These roads were dropped from the submission, but we are going to look into a process to add these roads to the next submission if they can be verified as accurate.

SUBMISSION 7: PROCESSING OF NEW DATA

For submission 7, we started data collection on January 1, 2013 by sending out data update requests and technical data specifications to all providers. This incorporated all the NTIA changes released as of August, 2012. These were sent to a large list of companies which were compiled from past collection efforts, and the revised FCC 477 list. All new data was requested using Census 2010 geography whenever possible.

We then actively followed up with the providers. As we had discovered in the past, many of the providers listed on the FCC 477 list are either resellers, or not involved in the actual delivery of broadband. (Many are VOIP or teleconference service providers that utilize existing broadband connections.)

In our solicitation for data updates, we told known past providers that if we didn't hear from them by a certain date, we would default to using their data from Submission 6. We contacted them after the due date a few times but for six providers, we eventually had to just reuse Submission 6 data.

All data received went through the following processing steps:

1. **Triage**: All new data was quickly reviewed to understand what was received, and in what format. We also made sure we had all the required components for NTIA's data model, such as their FRN and advertised speed information. We also screened for any known issues that we might have seen before (such as Excel 2003 spreadsheets that cut off at 32k rows.)

2. **Ingest**: At this time the data is actually brought into our systems. Each provider is set up with a unique file geodatabase to store their information. Record counts of what was received is logged so that we can validate we did not drop anything in processing.
3. **Data Processing**: This is where the data goes through a number of ETL routines to convert the raw proprietary information into a format similar to the NTIA format. The exact routine utilized depends on how the data is received:
    a. When a wireline provider submits a service boundary, we select all the blocks and roads inside that shape.
    b. If a wireline provider submits a customer address list, the points are geocoded, and then the appropriate block or road segment is selected.
    c. If a wireline provider submits block and road information using Census data, we just make sure everything is formatted to the appropriate specifications
    d. If the wireline provider submits any type of road or line data that does not direct correlate to the TIGER data set, we convert the lines to TIGER by selecting the road centroid and spatially selecting the closed segment in our data set. If the road is in a block less than 2sqmi, than the block is selected. Some manual cleanup is also applied to make sure we do not accidentally drop any road segments that should have been processed.
    e. Wireless provider data is formatted to ensure that there are no any overlapping polygons with the same technology type unless the provider is offering different speeds such as 3G and 4G over the same area. In addition the data is cropped to the state boundary.
    f. After each round of processing, we make sure that we only keep unique records. A unique record is defined as having a one of a kind combination of FRN, Block/Road ID, and technology type. If there are multiple records with different speeds, but all else is equal, than we select the maximum of the advertised speeds.
4. **QC Review**: All data is then sent to a different analyst to perform a through quality control review on the processed data set. Record counts are compared to what was submitted. The QC staff also make sure the ETL scripts and routines populated all of the right fields.
5. **QC Change Detection Review:** Data is then sent to another team for a second Quality Control Review. In this step the data is not only double checked against what was originally submitted, but it also brought up inside standardized MXD templates that allow us to make sure our results make sense. This step involves comparing the new data set with prior submissions, developing change maps, and looking for any possible technology or speed anomalies. At this stage we also begin our validation process. This includes looking at the provider data in comparison to things such as speed test results, franchise boundaries, siting information, and feedback from the planning surveys.
6. **Provider Review:** Processed data is all posted to a customized web application we refer to as our Provider Portal. All providers were notified once their data was available in the site, and they were always given time to review the data and respond. In this site, providers can log on and visually see their processed data in a map format. It also allows them to overlay their raw data to help them validate that we did indeed process things correctly. The provider portal also has a suite of markup tools that will allow the providers to edit their data, including adding or removing service areas, and making changes to the data attributes.
7. **Comment Processing:** All comments and feedback received from the provider portal, is then reviewed and applied to the processed data set. This updated data set goes back through our QA and QC processes, and if time allows, back out to the Provider Portal, for the provider to review and sign off on.
8. **Data Append:** After all of the individual data sets are processed and approved, we run an append process which merges all of the individual provider data sets into one geodatabase. This is also the point where our team will do any final transformations to get our working data model into the latest NTIA publishing format.

9. **Submission Comparison Check:** Starting with this submission an additional check was added to our quality review process. An application was written that compares the individual provider's unique data that is stored in their unique file to that which is stored in our final appended file and the NTIA submission data. Any variation in each of these data files in thoroughly investigated and resolved. This was done to assure no data loss or data transformation issues. We also compare this submission to the previous submission, review any variations and assure that the changes found can be documented as being requested by the provider.
10. **Final QA/QC:** A series of quality checks are run on the final appended data sets to ensure it is ready for submission to NTIA. We also run the latest version of the NTIA receipt tool at this time. If any issues are flagged as failing they are reviewed and corrected. All warnings are also reviewed and either corrected or documented in the attached document which explains that we have validated this data and it should be accepted. Any last issues are corrected, and the data is sent to the state for their review.
11. **Submission to NTIA**

As with the sixth data submission, we followed the following protocols:

1. We did not collect data from resellers
2. We collected data from satellite providers, only if they were able to provide to us all of the required information we need to pass onto NTIA: including spectrum, FRN, and advertised speeds.

COMMUNITY ANCHOR INSTITUTIONS DATA

The community anchor institutions data was primarily populated through State resources, in particular the CEN database which services many schools, colleges, and libraries. The CEN database was significantly improved for this submission by working closely with the state's BTOP team.

We also were able to get a connection survey results for all the libraries through the state library association. Location information for all other CAI points, notably, police, fire, and town halls, were obtained through the Department of Public Safety. All of this information was then populated into an online data gathering and validation web based application. Each town was contacted and asked to update their respective site information. While the web based responses have not been as high as we would like, we do feel that we are fortunate to have a good base set of data from the state.

CONNECTICUT SPECIFIC INFORMATION

Due to Connecticut's geography and population, 99.75% of the census blocks in the state are less than two square miles. The need for us to break apart coverage based on blocks versus roads leads to a lot of unnecessary confusion as well as creates some distorted pictures when you try to visualize this information on a map. For this reason, all of the maps available on the CT.gov/broadband website are published after we convert all of the data to just use blocks.

In the documentation form NTIA there has been a lot of discussion about making sure that a provider uses the same DBA and FRN consistently across all feature classes. We mentioned this to the providers, but there was some push back. Most providers complied with this request, but a few providers pointed out that while they may share a common name, they actually operate as separate organizations. Also, due to regulatory implications of the different FRN's a few providers did insist that their records not be combined.

The State of Connecticut built and maintains the Connecticut Educational Network, which is used to provide one high speed network connection to each town in the state (typically fiber, but some outliers are

still on DSL.) CEN network will typically install one fiber uplink in each town, and then it is the town's responsibility to provide connection between facilities. So for example CEN may supply the board of education's office with a 10mb connection, but then the board of education will run lines to each of the schools in the district. Because of this, many towns are reluctant to report speed information as there may technically be 10mb available to the school, but reporting that speed at each school would grossly overestimate how much connectivity they have in total, when in fact there may be 15 schools sharing that same uplink. In addition, CEN's primary mandate is to provide site to site connectivity between towns, and so they do not feel they meet the true definition of an internet provider, and as such, do not have a FRN. CEN is also limited by regulations to only support educational facilities, so they requested that their data only be shown as address points, as they cannot provide service to anyone else in that census block.

District of Columbia Spring 2013
State Broadband Availability Data Collection and Verification
Technical White Paper

District of Columbia Fall 2013
State Broadband Availability Data Collection and Verification Technical White Paper

Award #:	**11-50-M09011**
Award Period:	**10/1/2009 - 9/30/2014**
Project Type:	**State Broadband Initiative**
Organization Name:	**District of Columbia Office of Chief Technology Officer**
Project Title:	**ARRA SBDD - District of Columbia OCTO**
Contact:	**Matthew Crossett, Interim Geospatial Technology Manager**
Email:	**matthew.crossett@dc.gov**
Submission Date:	**April 1, 2013**

Introduction

The State Broadband Initiative (SBI) Program is a grant awarded by The National Telecommunications and Information Administration (NTIA), a division of the U.S. Department of Commerce. This Program is designed to fund projects that gather comprehensive and accurate state-level broadband mapping data, develop state-level broadband maps, aid in the development and maintenance of a national broadband map, and fund statewide initiatives for broadband planning.

The following white paper describes the data integration and verification processes employed by the District of Columbia in preparation of the broadband availability data submission to NTIA. This data collection is to be conducted on a semi-annual basis over a five-year period. The Spring 2013 data submission reflects conditions as of December 31, 2012.

The paper is divided into eight sections:

Section 1 - Data Description: describes April 1, 2013 deliverables to NTIA.

Section 2 - Provider Participation: summarizes provider cooperation.

Section 3 - Data Collection: describes outreach and collection efforts.

Section 4 - DC Geospatial Data: describes the role of DC GIS data in broadband data processing.

Section 5 - Data Integration and Processing: describes data manipulation steps.

Section 6 - Data Validation: describes efforts to validate the data received.

Section 7 – Documentation and Submittal: Includes the NTIA final checklist steps.

Section 8 – Appendix: Documentation, forms, and maps

SECTION 1 - DATA SUBMISSION DESCRIPTION

The District of Columbia's Spring 2013 submission consists of the following files:

DC_SBDD_20130401.zip – Consolidates all other files for the purpose of data transfer.

DC_SBDD_2013_04_01.gdb – An ESRI file based geodatabase that conforms to the data model distributed by NTIA. It contains primary data and metadata. The District provides NTIA with five data sets:

- **Community Anchor Institutions** – The location of community serving institutions and information about their broadband connections – if known.
- **Middle Mile Connections** – The locations and attributes of infrastructure that interconnects broadband networks.
- **Wireless Broadband Availability** – The service territories and attributes of wireless broadband providers including terrestrial fixed wireless and satellite.
- **Wireline Broadband Availability –** The territories and attributes of wireline broadband providers with 2010 Census Block geography.
- **Metadata –** Information about the data sets described above.

DC_DataPackage_2013_04_01.xls –A report on broadband providers contacted and the status of their submissions.

DC_2013_04_01.txt – An analysis of DC_SBDD_2012_10_01.gdb known as the "data submission receipt." This file is created by an automated script supplied by NTIA.

DC_Methodology_2013_04_01.pdf – An electronic version of the following document.

DC_Readme_2013_04_01.txt – A reduced file with the same information found in the header and section 1 of this white paper.

SECTION 2 - PROVIDER PARTICIPATION

- The Public Service Commission contacted 140 prospective broadband providers.
- Of those, 33 are believed to be providing broadband service in the District and are listed in DC_DataPackage_2013_04_01.xls.
- Of those, 24 meet the NOFA definition of 'available' (either wireline and or wireless).
- 9 providers submitted middle mile data.

SECTION 3 - DATA COLLECTION

Collection of Broadband Availability Data

The District of Columbia Office of the Chief Technology Officer ("OCTO") was awarded a grant from NTIA to map the availability of broadband services in the District of Columbia ("District"). OCTO has delegated to the District of Columbia Public Service Commission ("PSC") the responsibility for all interaction, including data collection, with the broadband service provider community.

Process Steps

- **Identifying and Contacting Broadband Providers -** The work of identifying providers is conducted by the PSC. The PSC reviewed its own records and those of the FCC. The initial identification of providers took place prior to the spring 2010 data call and has been refined for each NTIA submission. Firms identified as providers were:
    - All firms in PSC records as providing any kind of telecommunications service in the District.
    - All firms identified by the FCC having filed a form 477 for broadband service in the District.
    - **Contacting providers -** The PSC requested the assistance and cooperation of all commercial broadband service providers that provide service to any residential, business, institutional, or government entity located within the District, to provide the PSC with broadband service location data. Whenever possible, providers are initially contacted by email. The package of material sent by the PSC to providers:
        - **A letter from the Chairman of the District of Columbia Public Service Commission.** Sample letters can be found in **Appendix 1**. Providers receive one of two letters based upon their previous submission:
            - Providers that submitted data from the previous round and met the NOFA broadband service and availability definitions.
            - Providers from the previous round that did not meet the NOFA definitions or are new BSPs.
        - **Non-Disclosure Agreement** (NDA) The PSC offers every provider opportunity to enter into a NDA between OCTO and the Provider. The standard OCTO NDA is shown in **Appendix 2**. The NDA explains how OCTO will handle the submitted data; including what portions of the data will be submitted to the NTIA and what derived products will become part of the public website on broadband services available within the District that is maintained by OCTO. Key provisions of the District's standard NDA include:

- OCTO will provide the data to NTIA for the National Broadband Map.
- The service territories of individual providers will not be made public by OCTO, but OCTO has created a public web site that allows users, including potential broadband service subscribers, to enter any valid address in the District of Columbia and be referred to all the broadband service providers offering service at that location.
- Form 477 subscriber count data from all companies will be aggregated by OCTO at the Census Tract level. OCTO will use this information to estimate the residential broadband adoption rate by Census Tract. Estimated broadband service adoption rates will be made public, but the market share of individual broadband service providers will not be revealed.

▪ **Provider Submission Form -** The form is a Microsoft Excel based questionnaire which is accompanied by a glossary. **Appendix 3** contains a copy of the form and glossary. The form collects information on:

- The Provider (Includes: business name, DBA name, FRN#, URL, etc.)
- Transmission Technology
- Business type (facility based or reseller)
- Service Territory
- Maximum advertised and typical upload and download speeds
- Wireless spectrum
- Middle mile connection points

▪ **Technical Document –** The document provides detailed information on the requested data, data formatting, and data submission. The document is sent to providers that meet the NTIA definition of broadband availability.

o **Interaction with providers –** While we hope that all providers complete our forms, not all do. In practice OCTO will accept a variety of submission types and our policy is to work with providers interactively via email and phone whenever we or they have questions.

SECTION 4 - THE ROLE OF DC GEOSPATIAL DATA

DC GIS maintains several datasets that are integral to processing provider submissions. Each dataset and how it is employed is described below:

DC GIS Data Set (Click link to view and double click and zoom)	**Description**	**How the data is used in broadband processing**
Imagery	6" resolution 2010 ortho corrected imagery	GIS analysts superimpose provider service territory on imagery to ensure that submission fit the ground in a credible way. For example, do we have wireline service over water or parks?
DC Base Map	1" to 100' planimetric map.	Used similarly to imagery.
Master Address Repository	A precisely located point for every address in the District	Used to process address lists submitted by broadband providers. Also used to locate and map Community Anchor Institutions.
Education Libraries Health Public Safety Recreation	A variety of GIS layers that include Community Anchor Institutions locations	Used to identify and survey as many Community Anchor Institutions as possible.
Real Property	Ownership data with use codes	Used to ensure that broadband providers who provide to business are not shown as providing service in residential areas.
InfoUSA ISP Connectivity Database	Connectivity provider and connection type records by IP	Used to verify provider service area.

SECTION 5 - DATA INTEGRATION

- **Broadband Provider Data Submission Check-in**
    - Provider data submissions are received in several ways
        - Providers send email file attachments to the PSC.
        - Providers submit data by courier.
        - Providers upload the data to a secure OCTO FTP site.
        - Provider notifies the PSC that data has not changed since last submission
        - Submit updates through the Provider Portal.
    - PSC will then contact OCTO that new data has been received.
    - Scanned for viruses.
    - Entered into a submission tracking database.
    - Give an initial review to ensure that each major component is present.

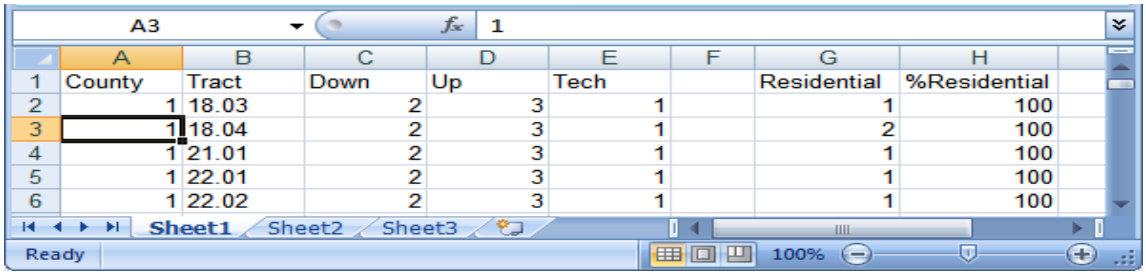
- **OCTO Data Ingestion –** The District of Columbia has implemented data submission and data processing tracking software. After the submission has been checked in by the PSC and received by OCTO, the provider submission status is entered into a data tracker database to reflect the current status of receipt and contents of the submitted data package.

- **Wireline Data Processing -** The following information was collected.
    - Provider Name
    - Doing Business As Name
    - FRN (Federal Registration Number)
    - Census Tract and Block number
    - Technology of Transmission
    - Maximum Download speed
    - Maximum Upload
    - Typical Download Speed
    - Typical Upload Speed

- **Wireline Data Processing - Geography**
    - **Service territory description -** In order for a provider to be eligible and have their data processed, the Company's service territory must offer broadband service to new customers within 10 days of a service order without extraordinary effort. Note: A Company can have multiple service territories within the District of Columbia, and those territories need not be contiguous. NTIA requires that the service territory be mapped

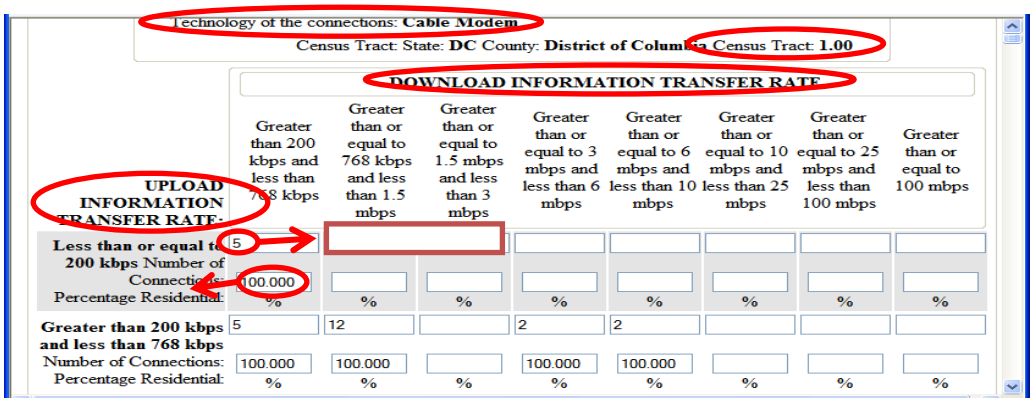
to the Census Block. Companies have several options for describing their service territory:

- **District-wide broadband service provider.** The Company must offer broadband service to all customers of the entire District of Columbia. If the Company meets the definition, the description of the Company's service territory is complete. The following definitions apply:
  - **"Broadband service"** is the provision to end users of two-way data transmission to and from the Internet with advertised speeds of at least 768 kilobits per second (Kbps) downstream and greater than 200 Kpbs upstream.
  - **"Offer"** means that the Company can provide broadband service to end users (a residential, business, institutional or government entity) within 10 business days of a service order without an extraordinary commitment of additional resources. It also interprets "offer" to be a commercial service. We are not mapping free services such as Wifi hotspots at this time. District of Columbia's free Wifi hotspots are included in the Community Anchor Data.
  - The **"entire District of Columbia"** means that a wireline company offers service to residential, business, institutional, or government end users in every Census Block in the District. This definition expressly excludes parkland, cemeteries, institutional campuses, bodies of water. The definition also excludes real estate complexes where the landlord, condominium association, or similar entity controls the provision of wireline service. Even if the firm doesn't offer service in all categories, it can still be a District-wide provider. Providers that service non-residential customers only are restricted to reporting service to commercial, high density residential, and industrial areas as defined by property use codes. Any firm claiming to be a citywide provider receives greater scrutiny.
- **Non District-wide broadband service provider.** Any of the following may describe the Company's service territory:
  - **List of Census Blocks –** The Company may provide a list of Census Blocks in which they offer service. The list should be provided in a Microsoft Excel File or Text File with each Census Block listed on a separate row.



	A	B	C	D	E	F	G	H
1	County	Tract	Down	Up	Tech		Residential	%Residential
2	1	18.03	2	3	1		1	100
3	1	18.04	2	3	1		2	100
4	1	21.01	2	3	1		1	100
5	1	22.01	2	3	1		1	100
6	1	22.02	2	3	1		1	100

- **Address File** - If service is only offered to certain addresses, a list of those addresses may be submitted. Address lists (whether for buffering or not) should be submitted in a Microsoft Excel table or text file with each address on a separate row. Address lists are geocoded to the structure using the District's Master Address Repository. OCTO encourages providers to submit all addresses where service can be provided within 10 days not just the address of current subscribers.
- **Written Description –** The Company may describe one or more polygons. For example, a service territory in part of downtown could be described as "East of 23rd Street NW, South of K Street NW, West of 17th Street NW, North of Constitution Ave NW. " Alternatively, the territories can be described by using buffers, for example, "Within 500 feet of 441 4th Street NW Washington DC 20001."
- **Detailed Map(s)** – Submitted maps should delineate the service area boundaries and label all DC streets within those boundaries. The map may be a PDF file. Geographic Information System (GIS) or Computer Aided Design files may be submitted in lieu of a map.
- **Form 477** – The Form 477 already includes a list of Census Tracts where the firm has existing customers. Census Blocks nest within Census Tracts. Optionally, the Company may indicate that it wishes to use the Census Tracts already listed within its Form 477, minus a list of Census Blocks within those Tracts in which it does not offer service.



- **Wireless Data Processing –** Wireless providers provide a polygon shapefile of their coverage area(s). If they are an existing provider they communicate if the coverage information has changed or resubmit a new shapefile of their coverage area. The majority of wireless provider's service areas are District-wide. The following information was collected.
    - Provider Name
    - Doing Business As Name
    - FRN (Federal Registration Number)
    - Technology of Transmission
    - Spectrum
    - Maximum Download speed
    - Maximum Upload Speed
    - Typical Download Speed
    - Typical Upload Speed

- **Middle Mile Data Processing -** Broadband service providers are also asked to list "middle-mile and backbone interconnection points" in the District of Columbia. Interconnection points are facilities that provide connectivity between (a) a service provider's network elements (or segments) or (b) between a service provider's network and another provider's network, including the Internet backbone. Collectively, (a) and (b) are middle-mile and backbone interconnection points. The following information was collected.
    - Provider Name
    - Dosing Business As Name
    - FRN (Federal Registration Number)
    - Ownership Status
    - Serving Facility Capacity
    - Serving Facility Type
    - Location
    - Elevation

- **Community Anchor Institutions -** As part of the reporting requirements for the grant, OCTO is required to collect a list of Community Anchor Institutions (CAI) and report broadband service available at these institutions. The dataset consists of schools, libraries, medical and healthcare providers, public safety entities, institutions of higher education, and other community support entities. Data is compiled from various district agencies and by contacting institutions directly. Non-government community anchors are contacted to complete an online survey. The survey

requested the internet service type and service speed at the institution's location(s). **Appendix 4** contains a copy of the Community Anchor Institution online survey form.

- **Data Review and Consultation with Providers**
    - If a component of the submission is missing, an OCTO GIS analyst will contact PSC for assistance to receive the missing data from the provider.
    - PSC and OCTO will schedule several meetings before final submittal: to review what providers have submitted data and who has not, discuss action points that need to be addressed, and review the process for areas of improvement.
    - Contact providers as needed to verify the submitted data. Most providers respond openly and are willing to make changes to their submissions when questions are raised.
    - Contact providers to review the processed data through the provider portal mapping application.
    - The NTIA receipt script is run against each provider submitted dataset separately. Repairs and reruns are iterated until the dataset successfully passes.

SECTION 6 - DATA VALIDATION

During this stage, data from providers are compared with data from other sources. Discrepancies are noted and sent to the contributing provider for comment. Validation techniques vary by the type of data submitted [wireless, wire line, or middle-mile]. The following steps were taken to validate the data submitted:

- **Wireless Validation -** The District completed drive testing of major wireless providers. Drive tests were completed in a single vehicle employing multiple laptops and GPS. This was accomplished by installing computer and GPS hardware and software in a vehicle and testing and mapping upstream and downstream transmission speeds. At this time, the District has not shown the drive test data to providers nor discussed our collection techniques with them. This data was collected with public funds and is not covered by NDAs, but DC has not made a decision to release it publically at this time. All providers who claim to be providing citywide wireless service are providing it, and to that end the District will declare all providers who submitted service territories to be "valid". That said, speed of service does drop below the definition of broadband, and does vary across providers, place, and time. The District did not conduct new drive testing for fall 2012. The fall 2010 drive testing results can be found in **Appendix 5.**

- **Wireline Validation**
    - The District, through PSC, has made extensive use of FCC Form 477 data. The Form 477 is used to, verify that we have contacted the correct providers, compare the technology of transmission and speed of transmission between what was reported to the FCC and what was submitted by the provider, compare the geography reported to the FCC by census tracts with the areas submitted to the District by census blocks. When discrepancies are found, the providers are asked for more information.
    - The District purchased a database of broadband subscribers from a commercial mailing list company InfoUSA. This dataset and the FCC broadband test data are used to crosscheck data coming from providers. When discrepancies are found, the providers are contacted to determine the validity of the data.

- **Middle Mile Validation –** To date the district has not attempted to validate middle mile data other than checking locations against GIS base data to be sure they are plausible.

- **Final Review -** All data undergoes a standup review conducted jointly by OCTO and PSC staff. Do service territories seem plausible? Do speeds seem realistic? How do speeds compare to other

providers using similar technologies? What is the total DSL, Cable, Fiber coverage and does it seem plausible?

- **Amalgamation and documentation** - Unless a provider's submission is conclusively invalidated (which hasn't happened) and the issue cannot be resolved with the contributing provider, it is included in the amalgamation phase. Until this stage, OCTO handles each submission separately. During this stage, all successful submissions are appended to the latest version of the NTIA/NSGIC geodatabase model, and requested transmittal forms are prepared.
    - The data is appended to the NTIA geodatabase model.
    - The amalgamated data is given a final quality review by the GIS Analysts involved in the broadband grant program.
    - FGDC Compliant metadata is prepared and included in the geodatabase.
    - The NTIA provided script is run for the last time on the data set as a whole.

SECTION 7 - DOCUMENTATION AND SUBMITTAL

Once past the quality review, the data package documents are updated the data sets are submitted to NTIA/FCC via secure FTP. The checklist provided by NTIA is below:

- Have you obtained a new clean Transfer Data Model?
- Have you followed the instructions for loading data into the Transfer Data Model?
- Have you run the receipt process (SBDD_CheckSubmission) and resolved all data integrity issues?
- Have you included your receipt text file as part of the package?
- Have you populated the metadata fields?
- Have you obtained a new data_package.xls and filled it out appropriately?
- Have you included methodological description?
- Have you followed the required naming conventions of all the files?
- If you are resubmitting any data for the current collection, have you (a) deleted your previous submission (b) informed the Program Office or the FCC of your resubmission and (c) resubmitted your entire data package (e.g., the Program Office is not accepting an partial submissions)?

Appendix 1
Letters from Public Service Commission to Prospective Broadband Providers

PSC letter to Providers that submitted data from the previous round and meet the NOFA requirements

Dear [Insert Name of Group #1 BSP Contact]:

The District of Columbia ("District") Public Service Commission ("Commission") and the Office of the Chief Technology Officer ("OCTO") would like to thank you for [Insert name of Company or Companies.] continued participation in the District's Broadband Service Mapping Program. To meet the objectives under the National Telecommunications and Information Administration ("NTIA") State Broadband Data and Development Grant Program, the Commission requests the assistance and cooperation of all broadband service providers that enable a residential, business, institutional, or government entity located within the District to use broadband Internet services. At this time, the Commission is now requesting broadband service availability data **current as of December 31, 2012** for processing and review before submittal to NTIA for the Spring 2013 National Broadband Map and database update.

Please note that the NTIA has requested that data be submitted using the Census 2010 geography if applicable. **The Commission requests broadband service providers submit their data updates by Friday, March 8, 2013, to allow an adequate time period for OCTO to process and review the data submission.** Information on data submission options can be found in the attached document.

I request that you also provide us with a copy of [Insert name of Company or Companies.] Broadband Service Report for the District of Columbia (Form 477) filed with the Federal Communications Commission ("FCC") on or before March 1, 2013. This will help OCTO identify any improvements or changes in the adoption rates for broadband services within the District. The Non-Disclosure Agreement with OCTO will continue to be honored.

More information regarding requested data, data formats, and submission options are outlined in the attached document. As a reminder, we have provided access to the District's Broadband Provider Portal to view and edit processed datasets. As a courtesy, account credentials issued during the last round of data collection are provided below. The portal can be accessed at the following URL.

http://host.appgeo.com/DistrictofColumbiaProviderPortal/

Your secure login account is provided as follows:

Username: [Fill in here.]

Password: [Fill in here.]

Thank you in advance for completing this data request. We have attempted to make the process minimally burdensome, but understand that questions may arise. Should you have any questions regarding this data request, please contact my Policy Advisor, Cary B. Hinton, at chinton@psc.dc.gov or 202-626-9186.

Thank you for your assistance,

Betty Ann Kane

Chairman

District of Columbia Public Service Commission

ATTACHMENT (1): DC SBDD Technical Document Spring 2013.pdf

PSC letter to Providers that did not meet NOFA requirements from the previous round

Dear [Insert name of Group #2 or Group #3 BSP Contact]:

The District of Columbia ("District") Public Service Commission ("Commission") and the Office of the Chief Technology Officer ("OCTO") would like to thank you for [Insert name of Company or Companies.] interest in the District's State Broadband Mapping Program.

At this time, the Commission is now requesting broadband service availability data current as of December 31, 2012 from providers that meet the definitions described below for processing and review before submittal to National Telecommunications and Information Administration ("NTIA") and inclusion in the National Broadband Map update. **The Commission requests broadband service providers submit their data updates by Friday, March 8, 2013, to allow an adequate time period for OCTO to process and review the data submission.**

Overview

To meet the objectives under the NTIA State Broadband Data and Development Grant Program, the Commission requests the assistance and cooperation of all broadband service providers by submitting data on the availability, technology of transmission, and downstream/upstream services if their company or organization:

1. Offers broadband services to end users in the District, or service could be established, without an extraordinary commitment of resources, or

2. Owns facilities in the District that make possible the delivery of broadband services by other companies that meet the description above.

Definitions

For the purposes of this Program, NTIA has adopted the following definitions:

"Broadband service" is the provision of data transmission technology that provides two-way data communication with the Internet with advertised speeds of at least 768 kilobits per second (kbps) downstream and greater than 200 kbps upstream to end users.

An entity is a **"facilities-based"** provider of broadband service connections to end user locations if any of the following conditions are met:

(1) It owns the portion of the physical facility that terminates at the end user location;

(2) It obtains unbundled network elements (UNEs), special access lines, or other leased facilities that terminate at the end user location and provisions/equips them as broadband; or

(3) It provisions/equips a broadband wireless channel to the end user location over licensed or unlicensed spectrum.

Service is **"available"** at an address if the provider currently provides service to a location, or if broadband service could be established, without an extraordinary commitment of resources, in a 7 to 10 business day period.

"End User" is a residential or business party, institution or state or local government entity, including a Community Anchor Institution, that may use broadband service for its own purposes and that does not resell such service to other entities or incorporate such service into retail Internet-access services. Internet Service Providers (ISPs) are not "end users" for this purpose.

Data Request

If your company or organization meets the NTIA's terms, as described above, and **has not** participated in a previous data submission to the Commission or OCTO, please contact Timour Skrynnikov at Timour.Skrynnikov@dc.gov for additional information and resources. The Commission encourages all broadband service providers to participate in the data collection effort so as to provide the Commission a better understanding of broadband services offered in the District and at the national level.

If your company or organization does not meet the NTIA's terms, as described above, I respectfully request that the attached service data questionnaire be completed. While not a requirement under the NTIA grant program, it will provide the Commission a better understanding of broadband services offered in the District, see attached "DC Broadband Mapping Questionnaire – Spring 2013". The information will not be part of the NTIA data submission. Please submit the questionnaire as an attachment to an e-mail response to Timour Skrynnikov: Timour.Skrynnikov@dc.gov. **The Commission requests broadband service providers to submit the questionnaire by Friday, March 8, 2013.**

Additionally, please provide information on the following items to Timour Skrynnikov:

1. If your company or organization has merged, sold, or bought another broadband service provider in the District or if your company has ceased operations in the District, please provide a description of such action as that can have an impact on OCTO's data submitted to the NTIA.

2. If your company or organization does not currently provide broadband Internet access services to a residential, business, institutional, or government entity located within the District, please provide a confirmation of such.

Form 477

I also request that you provide us with a copy of the Broadband Service Report for the District of Columbia (Form 477) that your company filed with the Federal Communications Commission ("FCC") on or before March 1, 2013. This will help OCTO identify any improvements or changes in the adoption rates for broadband services within the District. A "Raw data upload file for Part VI" text file, as described in the 'Completing and Filing FCC Form 477' document, is preferred but the District will accept a pdf copy.

The Form 477 can be submitted using one of several methods.

- Submit a new dataset to Timour Skrynnikov at the PSC via e-mail Timour.Skrynnikov@dc.gov.
- Submit a new dataset by requesting a temporary login to a secure FTP site.
- Submit a new dataset via postal service to:

Matthew Crossett

GIS Program Manager

200 I Street SE

Washington, DC 20003

Non-Disclosure Agreement

If your company would like to sign a Non-Disclosure Agreement ("NDA") with OCTO please email your request to Timour Skrynnikov: Timour.Skrynnikov@dc.gov. The NDA explains how OCTO will handle the submitted data; including what portions of the data will be submitted to the NTIA and what derived products will become part of OCTO's website on broadband services available in the District.

If your company or organization submitted a NDA with OCTO in association with a previous broadband data submission, it will continue to be honored by OCTO even though the two-year term of the NDA has expired. If your company would like to sign an amendment to the previous NDA that extends it for the additional three-years of this program please email your request to Timour Skrynnikov: Timour.Skrynnikov@dc.gov.

Thank you in advance for completing this data request. We have attempted to make the process minimally burdensome, but understand that questions may arise. Should you have any questions regarding this data request, please contact my Policy Advisor, Cary B. Hinton, at chinton@psc.dc.gov or 202-626-9186.

Thank you for your assistance,

Betty Ann Kane

Chairman

District of Columbia Public Service Commission

ATTACHMENTS (2):

1. DC Broadband Mapping Questionnaire – Spring 2013
2. Broadband Data Definitions – Spring 2013

Appendix 2
Standard Non-Disclosure Agreement

NON-DISCLOSURE AGREEMENT

(District of Columbia Broadband Service Mapping)

This **Non-Disclosure Agreement** ("**Agreement**") is between the Office of the Chief Technology Officer of the District of Columbia ("OCTO") and _____ ("Company"), a corporation having a business address at _____.

RECITALS

A. Company wishes to disclose and OCTO wishes to receive certain information from Company represented by Company to be confidential and commercial / proprietary information (hereinafter collectively, "Information") pertaining to _____. This exchange includes all communication of Information between the parties in any form whatsoever, including oral, written and machine readable form, pertaining to the above.

B. OCTO wishes to receive and Company wishes to disclose the Information for the sole purpose of participating in national broadband service mapping activities. OCTO will disclose the information only in the following ways:

To The public:

- The service territories of individual providers will not be made public, but OCTO will create a public web site that allows users, including potential broadband service subscribers, to enter any valid address in the District of Columbia and be referred to all the broadband service providers offering service to that location.

- Form 477 subscriber count data from all companies will be aggregated by OCTO at the Census Tract level. OCTO will use this information to estimate the residential broadband adoption rate by Census Tract. Estimated broadband service adoption rates will be made public, but the market share of individual broadband service providers will not be revealed.

To the U.S. Department of Commerce, National Telecommunications and Information Administration (NTIA):

- The broadband service data required by the NTIA in the Notice of Funds Availability; clarification published in the Federal Register; August 7, 2009 (74 FR 40569).

To the Metropolitan Police Department and the District of Columbia Homeland Security and Emergency Management Agency:

- Middle-mile connection points will be added to the District's critical infrastructure data base. This critical infrastructure database is used only for public safety purposes. These data will not be shared outside law enforcement and homeland security communities.

AGREEMENTS

Therefore, OCTO and Company agree as follows:

1. That the disclosure of Information by Company is in confidence and thus OCTO agrees to:

a. (1) Not disclose the Information to any other person, and (2) use at least the same degree of care to maintain the Information confidential as OCTO uses in maintaining as confidential its own confidential information, but always at least a reasonable degree of care;

b. Use the Information only for the above purpose;

c. Restrict disclosure of the Information solely to those employees or contract staff of OCTO having a need to know such Information in order to accomplish the purposes stated above; The District Government operates an in-house broadband service provider known as DC Net, accordingly, the Information expressly will not be shared by OCTO with DC Net as an organization or its employees.

d. Advise each such individual, before he or she receives access to the Information, of the obligations of OCTO under this Agreement, and require each such individual to maintain those obligations.

2. This Agreement imposes no obligation on OCTO with respect to any portion of the Information received from Company which: (a) was known to OCTO prior to disclosure by Company, (b) is lawfully obtained by OCTO from a third party under no obligation of confidentiality, (c) is or becomes generally known or publicly available other than by unauthorized disclosure, (d) is independently developed by OCTO or (e) is disclosed by Company to a third party without a duty of confidentiality on the third party.

3. This Agreement imposes no obligation on OCTO with respect to any portion of the Information unless such portion is: (a) disclosed in a written document or machine readable media marked as "COMMERCIAL / PROPRIETARY INFORMATION" at the time of disclosure, or (b) disclosed in any other manner and summarized in a memorandum mailed to OCTO within thirty (30) days of the disclosure. Information disclosed by Company in a written document or machine readable media and marked "COMMERCIAL / PROPRIETARY INFORMATION" includes, but is not limited to, the items, if any, set forth in the request for broadband service data from the District of Columbia Public Service Commission ("Commission"); attached hereto. The Commission's request for broadband service data is incorporated herein by reference. OCTO hereby acknowledges receipt of the items listed in the Commission's request for broadband service data, if any.

4. The Information shall remain the sole property of Company.

5. In the event of a breach or threatened breach or intended breach of this Agreement by either party, the other party shall be entitled to preliminary and final injunctions, enjoining and restraining such breach or threatened breach or intended breach.

6. OCTO agrees it will not export, directly or indirectly, any technical data acquired from Company or any product utilizing any such data to any country for which the U.S. Government or any agency thereof at the time of export requires an export license or other governmental approval, without first obtaining such license or approval.

7. The validity, construction, and performance of this Agreement are governed by the laws of the District of Columbia, and suit may be brought in the District to enforce the terms of this Agreement.

8. The rights and obligations of the parties under this Agreement may not be sold, assigned or otherwise transferred.

This Agreement is binding upon OCTO and Company and upon the directors, officers, employees and agents of each. This Agreement is effective as of the later date of execution and will continue indefinitely.

Office of the Chief Technology Officer of the District of Columbia

By

Name:_____

Title:_____

Date:_____

(Company)

By:

Name:_____

Title:_____

Date:_____

Appendix 3
Technical Document

DISTRICT OF COLUMBIA

SBDD DATA SUBMISSION TECHNIAL DOCUMENT

SPRING 2013

REQUESTED DATA

Under the directive of the NTIA State Broadband Initiative grant program, the District requests Internet Service providers in the District submit the following data in an approved data format. OCTO will provide guidance and assistance as needed.

- The provider's available broadband service area, technology of transmission, download and upload speeds
    - **NTIA is requesting that typical upload and download information be included in the data submission**
- Middle mile infrastructure
- FRN (FCC Registration Number)
- FCC Form 477 (March 1, 2013 filing)
- End User Type. The NTIA is requesting the type of end user for each record. Please refer to the NTIA code tables at the end of the document

Please send an email to Timour Skrynnikov if your company has merged, sold, or bought another broadband service provider in the District or if your company has ceased operations in the District, as this can have an impact on the data submitted to the NTIA.

NTIA Definition of Terms

"Broadband service" is the provision of data transmission technology that provides two-way data communication with the Internet with advertised speeds of at least 768 kilobits per second (kbps) downstream and greater than 200 kbps upstream to end users.

Service is "available" at an address if the provider currently provides service to a location, or if broadband service could be established, without an extraordinary commitment of resources, in a 7 to 10 business day period.

Internet Service Providers (ISPs) are not "end users" for this purpose. An entity is a "facilities-based" provider of broadband service connections to end user locations if any of the following conditions are met: (1) it owns the portion of the physical facility that terminates at the end user location; (2) it obtains unbundled network elements (UNEs), special access lines, or other leased facilities that terminate at the end user location and provisions/equips them as broadband; or (3) it provisions/equips a broadband wireless channel to the end user location over licensed or unlicensed spectrum.

BROADBAND AVAILABILTY AND MIDDLE MILE DATASET SUBMISSION OPTIONS

The broadband service availability and middle mile dataset can be submitted using one of several methods.

- If the dataset has not changed since last submission, the provider can verify so through the provider portal mapping application. OCTO will use this dataset for the Spring 2013 submission.
- The provider can submit a new dataset to Timour Skrynnikov at the PSC via e-mail Timour.Skrynnikov@dc.gov.
- The provider can submit a new dataset by requesting a temporary login to a secure FTP site.
- The provider can submit a new dataset via postal service.

Matthew Crossett
GIS Program Manager
200 I Street SE
Washington, DC 20003

- The provider can edit the previous submission through the provider portal mapping application to current as of December 31, 2012.

FCC FORM 477 SUBMISSION OPTIONS

The request for Form 477 filings will assist the District track broadband adoption rates and provide an additional resource to verify data submissions. A "Raw data upload file for Part VI" text file, as described in the 'Completing and Filing FCC Form 477', is preferred but the District will accept a pdf copy. The Form 477 can be submitted using one of several methods.

- The provider can submit a new dataset to Timour Skrynnikov at the PSC via e-mail Timour.Skrynnikov@dc.gov .
- The provider can submit a new dataset by requesting a temporary login to a secure FTP site.
- The provider can submit a new dataset via postal service.

Matthew Crossett
GIS Program Manager
200 I Street SE
Washington, DC 20003

WIRELINE PROVIDER DATA FORMATS

Wireline data are requested in one of the following data submission formats and the tables must include all required information by reporting method (Address point or census block).

- Flat text files (.csv or .txt)
- Spreadsheets (Excel)
- Database tables (Access or SQL).

The data will be processed to NTIA data standards and reviewed. Providers will have the ability to review and verify the processed datasets before the data is submitted to the NTIA grant office.

Address point table definition

Broadband availability can be reported by address. The table should include address records for all locations that are currently serviced and addresses that could be serviced within ten days. Required data in the table include the FRN, address, the Technology of Transmission, Maximum Up/Down speeds, and Typical Up/Down speeds. If more than one transmission type services an address, it must be reported as a separate record. The data will be aggregated to the census block geography. Refer to the code tables at the end of the document to populate the table.

FRN	Address	ZIP Code	Technology of Transmission	Maximum Downstream Speed	Maximum Upstream Speed	Typical Downstream Speed*	Typical Upstream Speed*	End User Category*
12345678	12 3rd St NW	12345	50	8	5	6	4	1
12345678	56 6th St NW	12345	41	5	2	4	1	1

**NTIA is now requesting this information be included in the data submission*

Census block table definition

Broadband availability can be reported by census block (2010 geography). The table should include census block records for all locations that are currently serviced as well as those that could be serviced within ten days. Required data in the table include the FRN, full FIPS Census Block ID, the Technology of Transmission, Maximum Up/Down speeds, and Typical Up/Down

speeds. If more than one transmission type services a census block, it must be reported as a separate record. Refer to the code tables at the end of the document to populate the table.

FRN	Census Block 15-digit FIPS	Technology of Transmission	Maximum Downstream Speed	Maximum Upstream Speed	Typical Downstream Speed*	Typical Upstream Speed*	End User Category*
12345678	123456789012345	50	8	5	6	4	1
12345678	123456789012346	41	5	2	4	1	2

**NTIA is now requesting this information be included in the data submission*

WIRELESS PROVIDER DATA FORMATS

The wireless data should be submitted as a geographic dataset with polygons depicting the extent of the service area and attributed with the requested broadband service information. Typical data formats include shapefiles or kml files. Required data in the table include the FRN, the Technology of Transmission, Spectrum, Maximum Up/Down speeds, and Typical Up/Down speeds. Please refer to the NTIA code tables at the end of the document to populate records.

FRN	Technology of Transmission	Spectrum	Maximum Downstream Speed	Maximum Upstream Speed	Typical Downstream Speed*	Typical Upstream Speed*
12345678	80	1	4	3	4	2

**NTIA is now requesting this information be included in the data submission*

MIDDLE MILE DATA FORMAT

Middle mile data are requested in one of the following data submission formats with requested infrastructure information.

- Flat text files (.csv or .txt)
- Spreadsheets (Excel)
- Database tables (Access or SQL).

Required data in the table include FRN, Ownership Status, Serving Facility Capacity, Serving Facility Type, Lat/Long, and Elevation (if known). Addresses can be substituted for lat/long

coordinates. OCTO will geocode the addresses and populate the records with the correct coordinates. Please refer to the NTIA code tables at the end of the document to populate records.

FRN	Owned or Leased	Serving Facility Capacity	Serving Facility Type	Latitude (Optional if address provided)	Longitude (Optional if address provided)	Elevation (in feet from grade)
12345678	1	4	1	38.02	-77.23	0

NTIA CODE TABLES

Provider Technology of Transmission Codes

Code	Description
10	Asymmetric xDSL
20	Symmetric xDSL
30	Other Copper Wireline - All copper-wire based technologies other than xDSL (Ethernet over copper and T-1 are examples)
40	Cable Modem - DOCSIS 3.0
41	Cable Modem - Other
50	Optical Fiber or Fiber to the End User
60	Satellite
70	Terrestrial Fixed Wireless - Unlicensed
71	Terrestrial Fixed Wireless - Licensed
80	Terrestrial Mobile Wireless
90	Electric Power Line
0	All Other

Speed Tier Codes

Speed Tier Codes Table		
Upload Speed Tier	**Download Speed Tier**	**Description**
2	n/a	Greater than 200 Kbps and less than 768 Kbps
3	3	Greater than or equal to 768 Kbps and less than 1.5 Mbps
4	4	Greater than or equal to 1.5 Mbps and less than 3 Mbps
5	5	Greater than or equal to 3 Mbps and less than 6 Mbps
6	6	Greater than or equal to 6 Mbps and less than 10 Mbps
7	7	Greater than or equal to 10 Mbps and less than 25 Mbps
8	8	Greater than or equal to 25 Mbps and less than 50 Mbps
9	9	Greater than or equal to 50 Mbps and less than 100 Mbps
10	10	Greater than or equal to 100 Mbps and less than 1 Gbps
11	11	Greater than or equal to 1 Gbps

End User Category Codes

Code	Description
1	Primarily Residential user
2	Primarily Business/Governmental user
5	Residential **and** Business/Governmental user

Wireless Spectrum Codes

Code	Description
1	is Cellular spectrum (824-849MHz; 869-894) used to provide service
2	is 700 MHz spectrum (698-758 MHz; 775-788 MHz; 775-788 MHz) used to provide service
3	is Broadband Personal Communications Services spectrum (1850-1915 MHz; 1930-1995) used to provide service
4	is Advanced Wireless Services spectrum (1710-1755 MHz; 2100-2155) used to provide service
5	is Broadband Radio Service/Educational Broadband Service spectrum (2496-2690 MHz) used to provide service
6	is Unlicensed (including broadcast television "white spaces") spectrum Used to provide service
7	is Specialized Mobile Radio Service (SMR) (817-824 MHz; 862-869 MHz; 896-901 MHz; 935-940 MHz)
8	is Wireless Communications Service (WCS) spectrum (2305-2320 MHz; 2345-2360 MHz), 3650-3700 MHz
9	Satellite (L-band, Big LEO, Little LEO, 2 GHz)

Middle Mile Serving Facility Type Codes

Serving Facility Type Code	Description
1	Fiber
2	Copper
3	Hybrid Fiber Coax (HFC)
4	Wireless

Middle Mile Serving Facility Capacity Codes

Serving Facility Capacity Code	Data Rate
1	Multiple T1s and less than 40 mbps
2	Greater than 40 mbps and less than 150 mbps
3	Greater than 150 mbps and less than 600 mbps
4	Greater than or equal to 600 mbps and less than 2.4 gbps
5	Greater than or equal to 2.4 gbps and less than 10 gbps
6	Greater than or equal to 10 gbps

Middle Mile Ownership Codes

Code	Description
0	Owned
1	Leased

Appendix 4
Provider Questionnaire

District of Columbia - Mapping Questionnaire Spring 2012

This questionnaire is directed to providers that have not qualified for participation in the National Broadband map. Each sheet collects a different type of information. Tabs at the bottom of the workbook allow users to switch among the three sheets.

Date Submitted:<mm/dd/yyyy>	
Company Name:	
Doing Business As:	
FRN #:	
Contact Name:	
Contact Email:	
Contact Address1:	
Contact Address2:	
Contact City, State Zip code:	

1.1 Provide a URL of the Company's website to which the District should refer potential broadband service subscribers.

1.2 Is your Company a facility based provider or a reseller? Please select the cell next to the technology that you provide and choose from the dropdown menu which business type applies.

Technology	Business Type	Technology	Business Type
10 Asymmetric xDSL		60 Satellite	
20 Symmetric xDSL		70 Terrestrial Fixed Wireless - Unlicensed	
30 Other Copper Wireline *(All copper-wire based technologies other than xDSL. Ethernet over copper and T-1 are examples)*		71 Terrestrial Fixed Wireless - Licensed	
40 Cable-DOCSIS 3.0		80 Terrestrial Mobile Wireless	
41 Cable-Other		90 Electric Power Line	
50 Optical Carrier/Fiber to the End User *(Fiber to the home or business end user. Does not include "fiber to the curb")*		0 Other *(Any Specific technology not listed above)*	

1.3 If your company is a resller, who is the facility based provider(s)?

1.4 Complete the following dropdown table for each Technology of Transmission that your company provides.
(One row for each Technology of Transmission - click on the cell to view a list of selections per column).

	Technology Transmission		Districtwide*	Maximum Advertised Speed		Typical Speed	
	Code	Description	Yes/No	Download Speed	Upload Speed	Download Speed	Upload Speed
(Ex.1)	***10 Asymmetric xDSL***		***Yes***	***768 kbps to 1.49 mbps***	***201 to 767 kbps***	***1.5 to 2.9 mbps***	***768 kbps to 1.49 mbps***
1							
2							
3							
4							
5							

**** Districtwide Definition**: The Company must be able to "offer broadband service" to the "entire District of Columbia", (residential, business, institutional or government entity **within 10 business days** of a service order without an extraordinary commitment of additional resources.) with advertised speeds of **at least 768 kilobits per second (Kbps) downstream and greater than 200 Kpbs upstream**.*

1.5 For each Technology of Transmission that was selected in 1.2 how long does it take to provide service to a customer after service has been ordered? (Click on the cell next to each Technology you provide and select the length of time from a drop-down list).

Technology	Length of time to provide service	Technology	Length of time to provide service
10 Asymmetric xDSL		60 Satellite	
20 Symmetric xDSL		70 Terrestrial Fixed Wireless - Unlicensed	
30 Other Copper Wireline		71 Terrestrial Fixed Wireless - Licensed	
40 Cable Modem - DOCSIS 3.0		80 Terrestrial Mobile Wireless	
41 Cable Modem - Other		90 Electric Power Line	
50 Optical Carrier (Fiber to end user)		0 All Other	

1.6 For each Technology of Transmission that was selected in questions 1.2, please provide your service area in any of the following data formats (each data format should include technology of transmission, maximum advertised download and upload speed, typical download and upload speed):
- GIS or CAD file(s)
- Text file or Excel Spreadsheet listing service addresses
- Text file or Excel Spreadsheet with a list of Census Blocks with Tract numbers
See graphics below of sample data formats

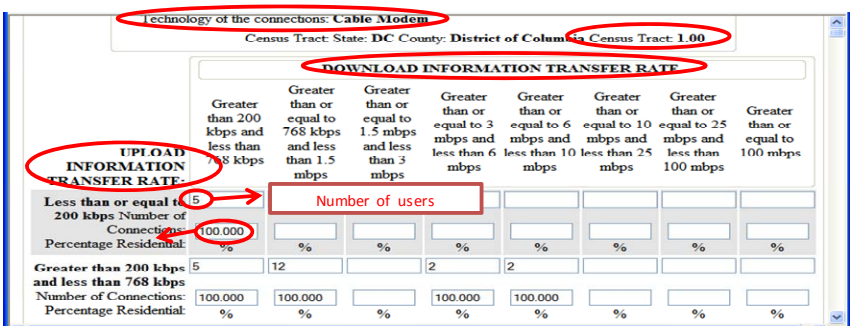
1.7 Does your company primarily make your service available to residential or non-residential (i.e. business) customers?

1.8 Can you provide this service within 10 business days of a service order without extraordinary commitment of additional resources?

1.9 If you provide broadband service and can offer it to customers (residential, business, institutional, or government entity) in the District of Columbia within 10 business days of a service order without extraordinary commitment of additional resources, the District of Columbia Public Service Commission encourages your participation in the State Broadband Mapping Program. We will be happy to discuss the benefits of participation with you.

1.10 Please provide a copy of your most recent filing of Form 477 to the FCC. Provide attachment filenames below. See data request letter for delivery options.

Ex. of Form 477 by Census Tract - Includes Technology of Transmission; Census Tract; Transfer Rate; Number of Users; and Percentage Residential.



Proceed to Sheet 2.

Provider Name

Wireless Spectrum Questions (Wireline only companies may skip this sheet.)

2.1 What spectrum(s) do you use to provide service? See table in Broadband Data Definitions guide for spectrum codes and descriptions.

Proceed to Sheet 3.

Broadband service providers shall provide a list of "middle-mile and backbone interconnection points" in the District of Columbia. Interconnection points are facilities that provide connectivity between (a) a service provider's network elements (or segments) or (b) between a service provider's network and another provider's network, including the Internet backbone. (Collectively, (a) and (b) are middle-mile and backbone interconnection points. Middle-mile and backbone interconnection points typically enable relatively fast data rates, are built to handle substantial capacities, and may be service-quality assured. Examples might include: points of interconnection enabling communications between an incumbent local exchange carrier's central office and the Internet, between a cable aggregation point (headend) and the Internet, or between a wireless base station and the provider's core network elements that connect to other networks, including the Internet.

3.1 Do you have any Middle Mile Facilities located in the District of Columbia?

"Yes" or "No"

3.2 If no, do you have Middle Mile Facilities in other states that serve customers within the District of Columbia?

3.3 Please list all Middle Mile Facilities that serve customers within the District of Columbia in the table below

Owned or Leased	*Serving Facility Capacity Code	**Serving Facility Type Code	Facility Address In DC (Street#, Street Name, Street Type, Quadrant)	*** Latitude (Optional if address provided)	*** Longitude (Optional if address provided)	Elevation (in feet from grade. Negative numbers are below grade)
Owned/Leased	*(1-6) See below*	*(1-4) See below*	*123 Main Street NW*	*38° 53' 43.6" N*	*77° 0' 56.35" W*	*15*
			...add rows as needed			

* Serving Facility Capacity Code	Data Rate
1	Multiple T1s and less than 40 mbps
2	Greater than 40 mbps and less than 150 mbps
3	Greater than 150 mbps and less than 600 mbps
4	Greater than or equal to 600 mbps and less than 2.4 gbps
5	Greater than or equal to 2.4 gbps and less than 10 gbps
6	Greater than or equal to 10 gbps

** Serving Facility Type Code	Description
1	Fiber
2	Copper
3	Hybrid Fiber Coax (HFC)
4	Wireless

*** Coordinates must be expressed using the WGS 1984 geographic coordinate system.

Appendix 5
Community Anchor Institution
Data Request Letter and Survey Form

Survey: Broadband Service of Community Anchor Institutions in DC – Spring 2013

Dear Anchor Institution,

The District of Columbia State Broadband Initiative (SBI) is requesting information on the level of broadband service at Community Anchor Institutions across the District. The collection effort is being led by the District's Office of the Chief Technology Officer (OCTO) and is funded by a grant from the National Telecommunications and Information Administration.

We request that your institution participate in this process by completing an online survey. The data you provide will help develop a more accurate, comprehensive dataset of broadband availability in the District and will further assist broadband planning efforts at a national level.

To facilitate this data collection request, OCTO has developed a web-based broadband survey mapping application. The survey can be completed in a few minutes by following these steps.

1) Access the broadband survey website here.
2) Login to the survey with the account information provided below.
   User: Password:
3) Select your Anchor Institution from the drop down menu.
4) Complete the survey questionnaire.
   Note: Previous CAI survey participants should see their responses pre-populated. Please verify and update as needed.
5) Update contact information as needed.
6) Logout when finished.

We request that your institution complete the survey by March 15th, 2013.

Your time and effort is appreciated and we thank you in advance for completing this data request. Should you have any questions, please contact me via email davidy.jackson@dc.gov or phone 202.724.5135.

Sincerely,

David Jackson

Direct URL to CAI survey portal:

http://broadband.dcgis.dc.gov/DCLogin.aspx?ReturnUrl=%2fDCcaisurvey.html

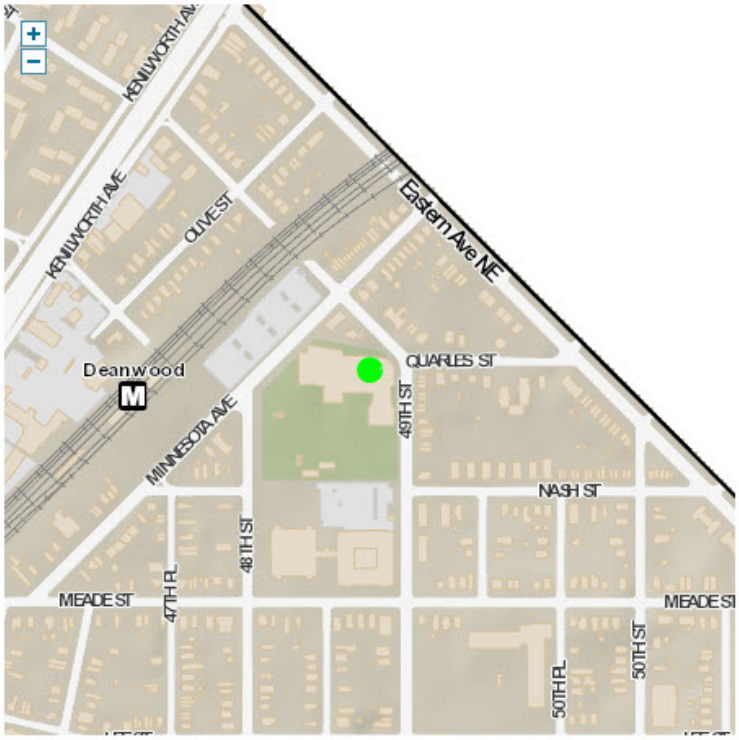
CAI Survey

Please answer the following questions to the best of your knowledge.

Please select the Institution

Deanwood Neighborhood Library

Mapped Location



Location address of Institution:

1350 49TH STREET NE

1. Website address of Institution

http://www.dclibrary.org/

2. Does the Institution subscribe to broadband service at this location?

(•) Yes ( ) No

3. Who is the broadband provider at this location?

Other

4. What type of technology is used for the Institution's broadband transmission? Click here to view Technology Definitions.

5. What is the DOWNLOAD speed advertised by the broadband provider?

6. What is the UPLOAD speed advertised by the broadband provider?

7. Is the broadband service sufficient to meet the Institution's needs?

( ) Yes ( ) No

Please Elaborate

8. Does the Institution provide public access to broadband at this location?

( ) Yes ( ) No

9. Does the Institution have publicly available Wi-Fi at this location?

(•) Yes ( ) No

10. How many public access terminals are available (answer must be a number)?

11. Are you currently physically located at the Community Anchor Institution address provided above?

( ) Yes ( ) No

Appendix 6

Wireless Validation

Mobile Broadband Mapping
Commercial Cellular Networks
District of Columbia

Bob Pavlak
Chris San-Gaspar

September 29, 2010

Mobile Broadband Mapping of Commercial Cellular Networks: District of Columbia

Executive Summary

The outdoor downlink and uplink throughput speeds of the commercial cellular networks serving the District of Columbia were measured in September 2010, and compared with measurements made in September 2009. In addition to the three networks tested in 2009 (Verizon Wireless, Sprint, AT&T), our 2010 measurements also include Cricket and T-Mobile.

All five of the service providers deliver broadband service (minimum 768 kbps downlink and 200 kbps uplink) in some areas of the District. However, there is a wide variation in coverage performance. Throughput speeds may be above the "broadband" thresholds in some areas and below the "broadband" thresholds in other areas. This variation in performance is shown by the color codes on the attached citywide maps.

There is also a significant variation in performance between the cellular service providers. The downlink speeds of the AT&T and T-Mobile networks are substantially above the broadband threshold of 768 kbps, with many areas above 1.5 Mbps. The speeds on AT&T's network are substantially higher in 2010 compared to 2009, which we believe is attributed to the 3G upgrade of the AT&T network to HSPA (High Speed Packet Access), a more recent version of 3G. Both AT&T and T-Mobile operate network infrastructure based on the 3GPP (3rd Generation Partnership Project) set of standards.

The uplink speeds on the AT&T network is by far the highest of any of the commercial service providers. We believe this is due to the more advanced version of the 3GPP standard used by AT&T. Uplink speeds on AT&T's network exceed 768 kbps and 1.5 Mbps in all but a few areas of the drive route.

The downlink speeds on Verizon's network, between 2009 and 2010, appear about the same. The uplink performance has improved, with many areas in 2010 above 768 kbps. Many areas in 2009 were above 200 kbps uplink (but less than 768 kbps). Similarly, Sprint's downlink performance appears about the same between 2009 and 2010, and their uplink performance in 2010 is slightly improved from 2009, but not as high as any of the other service providers.

Sprint, via Clearwire, now offers 4G WiMax broadband service in the District. This network was not included in our broadband drive tests because the mobility performance of WiMax is poor. Sessions are frequently dropped during handoffs and the tool used for drive test measurements is unable to accommodate a high dropped session rate.

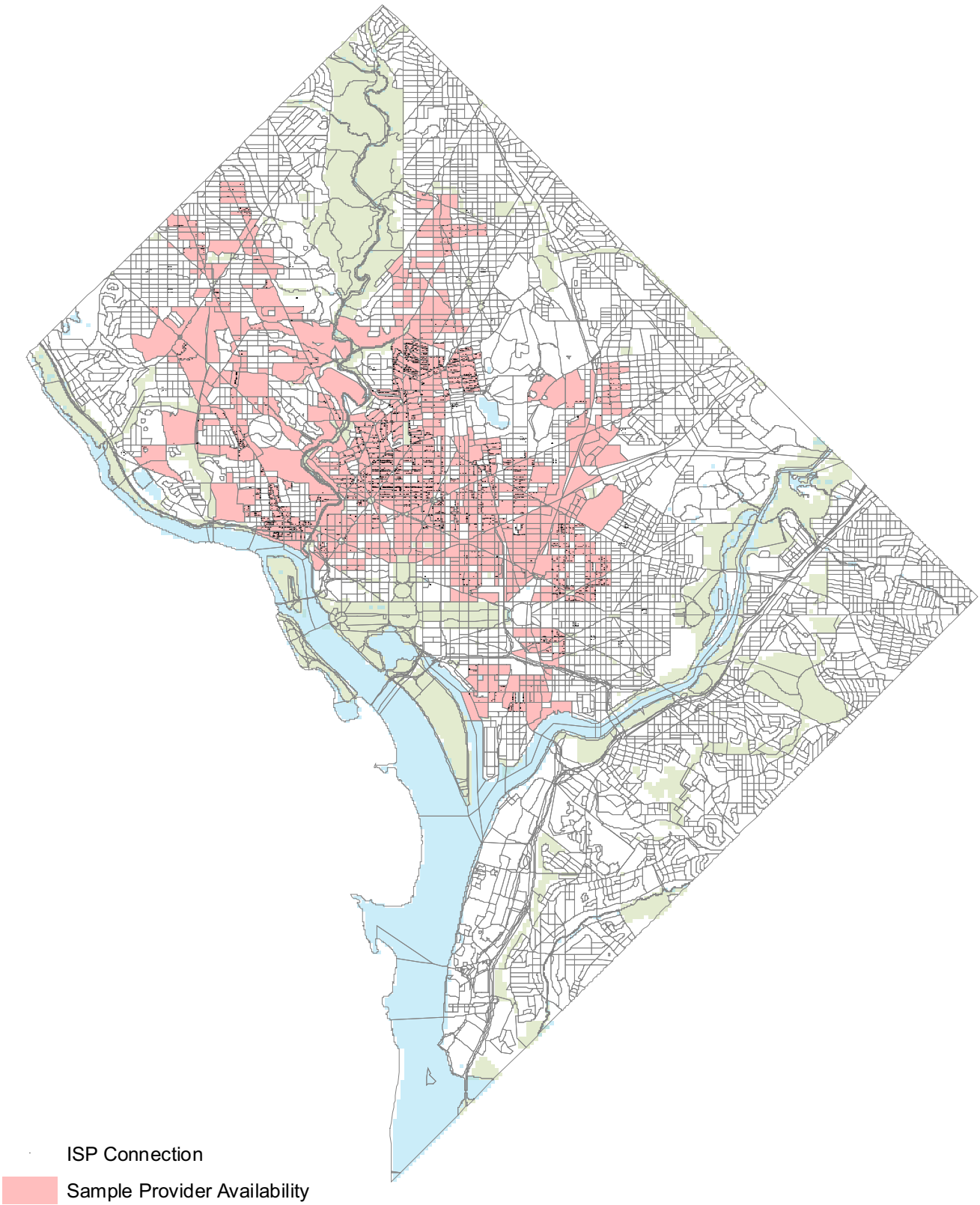
The authors wish to thank Felix Igbedior for his assistance in performing the drive tests with Chris San-Gaspar.

Appendix 7

Wireline Service Area Validation

Sample Map

Sample Provider Reported Availability vs. InfoUSA ISP Connections



Appendix 8
Contacted Providers

Provider Name
Allied Telecom Group
1-800-Reconex, Inc. d/b/a USTel
24/7 Mid-Atlantic Network, LLC
360Networks (USA), Inc.
A.R.C. Networks d/b/a InfoHighway
AboveNet Communications, Inc. d/b/a AboveNet Media Networks
Access One, Inc.
Access Point, Inc.
Accutel of Texas d/b/a 1-800-4-A-Phone
ACN Communication Services, Inc.
Airband Communications Inc.
Airespring, Inc.
Allconnect
AOC Connect, LLC f/k/a MFN Global Services, LLC
AT&T Communications of Washington DC, LLC
AT&T Inc. d/b/a New Cingular Wireless Services, Inc. a/k/a AT&T Mobility LLC
ATC Outdoor DAS, LLC
Atlantech Online, Inc.
Bandwidth.Com CLEC, LLC
BCN Telecom, Inc.
Bethel Communications
Bluemont Networks, LLC.
Broadcore, Inc.
Broadnet Solutions LLC d/b/a Broadnet Wireless
Broadview Networks, Inc.
Broadvox CLEC
BT Communications Sales, LLC f/k/a Concert Communications Sales, LLC
Budget PrePay, Inc. d/b/a Budget Phone
BullsEye Telecom, Inc.
Business Telecom, Inc. d/b/a BTI
Cable & Wireless Americas Operations, Inc.
Capsule Communications (Merged with Covista in Feb. 2002)
Cat Communications International, Inc. d/b/a CCI
Cbeyond Communications, LLC
CityNet Telecom, Inc.
Clearwire Corp.
Cogent Communications of DC, Inc.
Comcast of the District, LLC
ComExpress Communications, Inc.
CommPartners Connect, LLC
Comtech 21, LLC
Covista, Inc.
Cox District of Columbia Telcom, LLC
Crexendo Business Solutions
Cypress Communications Operating Company
DC Access, LLC

DC-CLEC LLC c/o Crown Castle Solutions
Deutsche Telekom AG d/b/a T-Mobile USA. Inc.
dishNET Wireline L.L.C. formerly Liberty-Bell Telecom, LLC dba DISH Network Phone & Internet
DSCI Corporation
Dynalink Communications, Inc.
Enkido, Inc.
Entelegent Solutions
Eureka Telecom, Inc. d/b/a InfoHighway Communications
Everest Broadband Networks of DC
Extenet Systems Inc.
Fiber Technologies Networks, L.L.C.
FiberLight, LLC
First Communications, LLC
France Telecom Corporate Solutions L.L.C.
Gateway Communications Services, Inc.
Global Crossing Local Services
Global Crossing Telemanagement, Inc.
Global Telecom & Technology Americas, Inc.
Google
Granite Telecommunications, LLC
Great American Networks, LLC.
Hughes Communications, Inc. a/k/a HNS License Sub, LLC a/k/a Hughes Network Systems, LLC d/b/a Hughes Net
Hypercube Telecom d/b/a/ KMC Data LLC
IDT America, Corp.
Infotelecom, LLC
Intellifiber Networks, Inc. (A Paetec Company)
Intrado Communications, Inc.
IPC Network Services, Inc.
Iridium Satellite LLC
Kentucky Data Link, Inc.
LCI International Telecom Corporation d/b/a/ Qwest (acquired by CenturyLink)
Leap Wireless International, Inc.d/b/a Cricket Wireless
Level 3 Communications, LLC
Light Tower Fiber LLC
LightSquared Inc. f/k/a SkyTerra Communications Inc.
Magellan Hill Technologies, LLC
MassComm, Inc. d/b/a/ Mass Communications
Matrix Telecom, Inc. d/b/a Matrix Business Technologies (Trinsic)
McGraw Communications, Inc.
MegaPath Corporation
Metropolitan Telecommunications of DC d/b/a MetTEL
Mitel NetSolutions, Inc. f/k/a Inter-Tel Netsolutions, Inc.
NationsLine District of Columbia
Neon Connect, Inc. - RCN
Network Communications International Corp.
Neutral Tandem-Washington, DC, LLC
New Edge Network, Inc. d/b/a New Edge Networks (Earthlink Business)

New Horizons Communications Corp.
NextG Networks Atlantic, Inc.
Norlight Telecommunications, Inc.
NOS Communications
One Voice Communications, Inc.
OpenBand of DC, LLC
Pac-West Telecomm, Inc.
Peerless Network of the District of Columbia, LLC
PEG Bandwidth DC, LLC
Pelzer Communications Corporation
Primus Telecommunications, Inc.
Quantum Shift Communications, Inc. d/b/a VCOM Solutions
Quintelco, Inc.
Qwest d/b/a/ CenturyLink
RapidDSL & Wireless Inc.
Reliance Globalcom Services, Inc. f/k/a Yipes Enterprise Services, Inc.
RNK, Inc.
Roadstar Internet, Inc.
Shenandoah Telecommunications Company d/b/a Shentel Converged Services, Inc.
Sidera Networks
Skycasters
Smart Choice Communications, LLC
Spacenet d/b/a StarBand Communications Inc.
Spectrotel, Inc.
Sprint Nextel Corp.
Starpower Communications, LLC d/b/a RCN Corp.
Stratos Global Corp.
Telefonica Data Corp. SA d/b/a Telefonica USA, Inc.
Teleport Communications of Washington, DC, Inc.
Telovations, Inc.
Trans National Communications International, Inc.
Transbeam, Inc.
Trident Internet Systems, Inc. d/b/a Trident Wireless Internet
TW Telecom of D.C. LLC., f/k/a Time Warner Telecom of D.C. LLC., f/k/a Xspedius Management Co.
VDL, Inc. d/b/a Global Telecom Brokers
Vector Data Systems LLC
Verizon Communications, Inc. a/k/a Verizon Business Global LLC d/b/a Verizon Business
Verizon Communications, Inc.d/b/a Verizon Wireless a/k/a Cellco Partnership
ViaSat Inc.
Voxbeam Telecommunications, Inc.
Wave2Wave Communications, Inc.
Wholesale Carrier Services, Inc.
Windstream Communications
XO Communications Services, Inc.
YMax Communications Corp.
Zayo Bandwidth Northeast, LLC f/k/a PPL Telecom
Zone Telecom, LLC

Submitted to:

Delaware Department of Technology and Information

Contract No. DTI-08-0013

Delaware Broadband Data and Development

Spring 2013 Data Submission White Paper

Submitted by:

GeoDecisions
A Division of Gannett Fleming

March 2013

Table of Contents

1 Introduction

As part of the American Recovery and Reinvestment Act (ARRA), the National Telecommunications and Information Administration (NTIA) released its State Broadband Data and Development Grant Program[1] Notice of Funds Availability (NOFA). The NTIA then awarded the State of Delaware funding to create a database of broadband deployment (Project) in the State of Delaware (State). GeoDecisions and its team partner CBG Communications, Inc. (CBG) have been retained by the State of Delaware (collectively referred to as the "State Parties") to perform a variety of tasks as part of the Broadband Data Development process, with the goal being creation of maps of the State showing where broadband is available, Providers' names, and speeds or bandwidth provided to citizens, businesses, and anchor institutions throughout the State.

The NOFA requires mapping of facilities-based Providers' availability of broadband speed internet access in the State. The NTIA, in the NOFA, defined broadband as "Broadband service is 'available' to an end user at an address if a broadband service provider does, or could, within a typical service interval (7 to 10 business days) without an extraordinary commitment of resources, provision two-way data transmission to and from the Internet with advertised speeds of at least 768 kilobits per second (Kbps) downstream and at least 200 Kbps upstream to the end user at an address."

The following specific project tasks were to be performed and completed by GeoDecisions and CBG with oversight by State staff:

- Drafting, negotiation, establishment, and status reporting of all Non-Disclosure Agreements (NDAs) with broadband service Providers to support the Delaware broadband expansion initiative.
- Mapping of broadband Providers and service attributes, including technologies utilized and advertised speeds available to end users.
- Support of field verification of broadband mapping (using an approximately 35% sampling rate).
- Development of web-based mapping applications.
- Project, task, and contract management.
- Review of Provider marketing materials.
- Assistance in developing criteria for web-based surveys and speed tests.
- Quality Control and review of all deliverables.
- Assistance in the development of a data maintenance document.
- Identification and assessment of broadband infrastructure (using an approximately 35% sampling rate).
- Participation in weekly status and project meetings with internal staff, NTIA, the University of Delaware, the State of Delaware, Providers, and all other stakeholders or as required.
- Submission of weekly status reports or as required.

[1] http://broadbandusa.gov/files/BroadbandMappingNOFA(FederalRegisterVersion).pdf

The Project began with meetings with the State, GeoDecisions, and CBG to map out the processes that needed to occur in order to produce an accurate map that included all known broadband Providers that were willing to participate in the project. It should be noted that broadband Providers (Providers) were not required to participate in the Project but were encouraged to provide data specific to their networks so the State would have maps that were as accurate as possible. Providers that applied for federal grant funds for network expansion or upgrades, however, would be eliminated from consideration for these grants if they did not cooperate with the State on this project.

1.1 List Compilation

The first task was to compile a list of all known broadband Providers throughout the State and contact information for each of these Providers. Information from FCC databases, Internet research, and the State Parties' overall understanding of the broadband industry was utilized to compile the list. Updates are made to the list each round based on these sources and/or provider interaction.

1.2 NDA Negotiation

Contact was then made to each of the Providers to determine whether they had facilities in the State that provided broadband to end users. If so, the Providers were encouraged to participate in the project by providing the pertinent data needed to create the State's maps. Many Providers believe that some of the information required from them for participation is confidential and cannot be released to the general public. To overcome this obstacle, the State Parties created a Non-Disclosure Agreement (NDA) template whereby information deemed confidential by the Providers would not be released publically by the State Parties. The NDA also ensured that all information requested from the Providers is available for release to the NTIA as required by the NOFA. Based on the variation among Providers on what information is deemed confidential and varying interpretations of the template NDA, negotiations were held with many of the Providers to modify the NDA to meet the Providers' needs while still allowing the State Parties to utilize and share the information as required in the NOFA. Once the Providers and the State Parties signed an agreed-upon NDA, the data gathering process proceeded. When Providers change, an NDA is created as required.

1.3 Data Gathering

As each Provider signed an NDA with the State Parties, they were referred to GeoDecisions' mapping department where they were asked to provide specific data in formats that would be compatible with the State's mapping process. Although many of the Providers had previously provided system data to the Federal Communications Commission (FCC), those submissions showed availability at the Census Tract level. The requirements of this Project were for mapping of network availability at the Census Bock level, which is more granular than previously submitted data. Furthermore, in Census

Blocks that are larger than 2 square miles, data was gathered at the street segment level (eg. From # 1 First Street to #111 First Street).

Prior to each round, NTIA provides the database schema specification in which providers should provide their data to the the State Parties; NTIA may choose to not adjust the schema from the prior round. In January 2013, NTIA requested providers submit their data as overlapping polygons in areas where multiple speeds and spectrum bands are used. In previous submissions only the highest speed polygon was required for areas with multiple tiers. This previous submission approach - called clipping polygons - is no longer desired.

As Providers supplied their data, GeoDecisions created maps of the State showing where each of the Providers' footprint(s) was located, as well as other required attributes such as advertised speeds available in these areas and the technologies utilized to provide service to end users.

1.4 Provider Data Submittal

NTIA 7th data submission included data from 20 Broadband providers, where 13 of the providers have submitted new data updates; the following is a brief description of the data provided:

1- AT&T Mobility LLC.

DBA Name: AT&T

FRN	0004979233
Date of submission	2/11/2013
Type of Data Submission	• 3 Coverage Shape files • Excel Sheet
Census Blocks	N/A
Road Segments	N/A
Middle Mile infrastructure	No
Technology of Transmission	Terrestrial Mobile Wireless
Data description	AT&T provided 3 shape files that showed coverage of: • 3G • 4G • 4G-LTE Over the three counties of the state of Delaware. The excel sheet contained speed data, Technology of transmission & Mobile Spectrum.

2- Comcast Cable Communications, LLC.

DBA Name: Comcast

FRN	0004441663
Date of submission	2/11/2013
Type of Data Submission	• Excel Sheet of block coverage • Excel Sheet of street coverage • Excel Sheet with speed information
Census Blocks	13171 Technology 40
Road Segments	723 Technology 40
Middle Mile infrastructure	No
Technology of Transmission	Cable Modem - DOCSIS 3.0
Data description	Three excel sheets, which included: Comcast blocks coverage, Street coverage, and speed information

3- MegaPath Corporation.

DBA Name: MegaPath

FRN	0003753787
Date of submission	1/18/2013
Type of Data Submission	• Text file tab delimited with block coverage • Text File with Subscriber-Weighted Nominal Speed • Text file with a note "No Middle Miles in DE"
Census Blocks	3868 Technology 10 2805 Technology 20 6544 Technology 30
Road Segments	No
Middle Mile infrastructure	No
Technology of Transmission	Asymmetric xDSL Symmetric xDSL Other Copper Wireline
Data description	Two text files tab delimited, and a read me file. One text file contains only block coverage data for blocks less than 2 square miles. The other text file contains data of subscriber-weighted nominal speed.

4- Leap Wireless International, Inc.

DBA Name: Cricket Communications, Inc.

FRN	0002963528
Date of submission	2/22/2013
Type of Data Submission	• Shape file with two Coverage areas, Technology, Spectrum, and speed
Census Blocks	N/A
Road Segments	N/A
Middle Mile infrastructure	No
Technology of Transmission	Terrestrial Mobile Wireless
Data description	Shape file that contains two overlapping coverage areas: one coverage area for 3G coverage, the other is for 4G. Both are located in Newcastle county.

5- T-Mobile USA, Inc.

DBA Name: T-Mobile.

FRN	0006945950
Date of submission	1/22/2013
Type of Data Submission	• Two shape files with Coverage Area with different speed • Text file with technology and Spectrum and speed • Excel sheet with Subscriber Weighted Nominal Speed. • No Middle Mile Notice.
Census Blocks	N/A
Road Segments	N/A
Middle Mile infrastructure	No
Technology of Transmission	Terrestrial Mobile Wireless
Data description	Two shape files that provide Broadband coverage with two different speed ranges for upload and download; the Technology and spectrum were provided by a different text file; Nominal speed came from an excel sheet.

6- Cellco Partnership and its Affiliated Entities.

DBA Name: Verizon Wireless.

FRN	0003290673
Date of submission	1/17/2013
Type of Data Submission	• Shape file for 4G Coverage (LTE) • Shape file for 3G Coverage (EVDO) • Email with Spectrums and speed.
Census Blocks	N/A
Road Segments	N/A
Middle Mile infrastructure	No
Technology of Transmission	Terrestrial Mobile Wireless
Data description	The two shape files provided Coverage area for different speed range (4G – 3G), an email provided the speed and spectrum.

7- Verizon Communications, Inc.

DBA Name: Verizon Delaware, LLC.

FRN	0003271798
Date of submission	2/27/2013
Type of Data Submission	• Text file tab delimited with block coverage • Text file tab delimited with street segment coverage • Text file with Weighted Nominal Speed by technology and county. • Notice with no middle mile
Census Blocks	11573 Technology 10 6755 Technology 50
Road Segments	1153 Technology 10 456 Technology 50
Middle Mile infrastructure	No
Technology of Transmission	Asymmetric xDSL Optical Carrier/Fiber to End User
Data description	Two Text files with Census blocks and Street segment coverage; weighted nominal speed came in a separate text file.

8- Sprint Nextel Corporation.

DBA Name: Sprint.

FRN	0003774593
Date of submission	2/1/2013
Type of Data Submission	• One Shape file with two Coverage areas with different spectrums and speeds. • A Readme file explaining the coverage area.
Census Blocks	N/A
Road Segments	N/A
Middle Mile infrastructure	No
Technology of Transmission	Terrestrial Mobile Wireless
Data description	One Shape file specifying the spectrum and speed of two coverage areas.

9- Hughes Communications, Inc.

DBA Name: Hughes Network Systems.

FRN	0018483073
Date of submission	2/4/2013
Type of Data Submission	• An Email Stating that Hughes Net covers the entire state, including speed and technology
Census Blocks	N/A
Road Segments	N/A
Middle Mile infrastructure	No
Technology of Transmission	Satellite
Data description	Email with coverage and speed.

10- Clearwire Corporation.

DBA Name: Clear (WiMAX markets), Clearwire (Expedience Markets)

FRN	0017775628
Date of submission	1/15/2013
Type of Data Submission	• One Shape file with Coverage • A Word document with FRN, Technology, and Speed information
Census Blocks	N/A
Road Segments	N/A
Middle Mile infrastructure	No
Technology of Transmission	Terrestrial Fixed wireless-licensed
Data description	One Shape file with coverage information, and a document for FRN, technology and speed information.

11- Atlantic Broadband (Delmar), LLC.

DBA Name: Atlantic Broadband

FRN	0009596875
Date of submission	2/26/2013
Type of Data Submission	• Text file tab delimited with block coverage • PDF file with FCC 477 form
Census Blocks	1342 Technology 41
Road Segments	215 Technology 41
Middle Mile infrastructure	No
Technology of Transmission	Cable Modem - Other
Data description	Text files tab delimited, contains block coverage, and FCC 477 form contains FRN, and technology of transmission

12- Level 3 Communications, LLC.

DBA Name: Level 3 Communications, LLC

FRN	0009596875
Date of submission	2/26/2013
Type of Data Submission	• Text file tab delimited with Address point availability • Text file with Middle mile information
Census Blocks	39 Technology 50
Road Segments	No
Middle Mile infrastructure	No
Technology of Transmission	Optical Carrier/Fiber to the End User
Data description	Text files tab delimited, contains two address point service locations, and a middle mile text file contains 4 middle miles locations

13- Mediacom Delaware LLC.

DBA Name: Mediacom

FRN	003572633
Date of submission	3/5/2013
Type of Data Submission	• An Excel sheet including a list of service addresses, technology, and speed.
Census Blocks	2155 Technology 40
Road Segments	257 Technology 40
Middle Mile infrastructure	No
Technology of Transmission	Cable Modem - DOCSIS 3.0

Data description	The excel sheet contains a list of formatted address fields, that includes street number, city, and zip code, also includes census technology and speed information.

1.5 Data Processing

The method for processing the data varies depending on the data received from each provider; the following is a brief summary of the steps taken to process the data for each provider for the 7th round.

1-AT&T Mobility LLC.	
Processing Mobile Coverage Area	• Apply Repair Geometry on coverage Shape file. • Load Repaired Shape file into Transfer data model using append. • Use excel sheet values to calculate technology, spectrum and speed for three speed tiers (3G-4G-4G-LTE). • Result is stored in "BB_Service_Wireless".

2- Comcast Cable Communications, LLC.	
Processing Census Block Coverage Area	• Census block coverage excel sheet exported into dbf after adjusting column name (less than 11 characters). • Template of 2010 Census block < 2SQM joined Technology 40 dbf file (create Census block coverage of Cable Modem-DOCSIS 3.0. • Census Block Coverage is loaded to Transfer Data model using append. • Result is stored in "BB_Service_CensusBlock".
Processing Service Overview	• Template County feature class is loaded into ArcMap. • Subscriber Weighted Nominal speed is calculated in each country . • County layer is loaded into Transfer Data model using append. • Result is stored in "BB_Service_Overview".

3- MegaPath Corporation	
Processing Census Block Coverage Area	• Load provided text file into excel. • Export text file into dbf after altering columns names. • Separate dbf file into 3 technologies dbf files (Asymmetric xDSL - Symmetric xDSL -Other Copper Wireline). • Perform Join 3 times with Template census 2010 census block (one join per technology). • Merge the 3 feature classes into one coverage feature class. • Load the output feature class into the transfer data model. • Result is stored in "BB_Service_CensusBlock".
Processing Service Overview	• Template County feature class is loaded into ArcMap. • Three Overview county layers are produced, one layer per technology. • County layers are merged. • County layers are loaded into Transfer Data model using append. • Result is stored in "BB_Service_Overview".

4- Leap Wireless International, Inc. (Cricket)	
Processing Mobile Coverage Area	• Apply Repair Geometry on coverage Shape file. • Load Repaired Shape file into Transfer data model using append. • Calculate technology, spectrum and speed. • Result is stored in "BB_Service_Wireless".

5- T-Mobile USA, Inc.	
Processing Mobile Coverage Area	• Apply Repair Geometry on two coverage Shape files. • Load the two Repaired Shape files into Transfer data model using append. • Calculate technology, spectrum and speed. • Result is stored in "BB_Service_Wireless".

6- Cellco Partnership and its Affiliated Entities. (Verizon Wireless)	
Processing Mobile Coverage Area	• Apply Repair Geometry on coverage on both Shape files (4G-3G). • Load Repaired Shape files into Transfer data model using append. • Calculate technology, spectrum and speed, for each type of coverage. • Result is stored in "BB_Service_Wireless".

7- Verizon Communications, Inc.	
Processing Census Block Coverage Area	• Load provided text files into excel. • Census block coverage excel sheet exported into dbf after adjusting column name (less than 11 characters). • Select statement on the dbf file to separate Technology coverage 10 blocks & Technology Coverage 50 blocks. • Template of 2010 Census block < 2SQM joined twice, one time with Technology 10 dbf file (create Census block coverage of Asymmetric xDSL), second time with Technology Coverage 50 (create Census block coverage of Optical Carrier/Fiber to End User). • Merge is applied on both Census blocks to create Census Block Coverage. • Census Block Coverage is loaded to Transfer Data model using append. • Result is stored in "BB_Service_CensusBlock".
Processing Service Overview	• Template County feature class is loaded into ArcMap. • Two Overview county layers are produced, one layer per technology. • County layers are merged. • County layers are loaded into Transfer Data model using append. • Result is stored in "BB_Service_Overview".

8- Sprint Nextel Corporation.	
Processing Mobile Coverage Area	• Apply Repair Geometry on coverage Shape file. • Load Repaired Shape file into Transfer data model using append. • Use excel sheet values to calculate technology, spectrum and speed. • Result is stored in "BB_Service_Wireless".

9- Hughes Communications, Inc.	
Processing Satellite Coverage Area	• Create a shape file covers the whole state area, to represent the satellite coverage. • Assigned technology download and upload speed to the shape file. • Result shape file is stored in "BB_Service_Wireless".

10- Clearwire Corporation	
Processing Mobile Coverage Area	• Apply Repair Geometry on coverage Shape file. • Load Repaired Shape file into Transfer data model using append. • Calculate technology, spectrum and speed. • Result is stored in "BB_Service_Wireless".

11- Atlantic Broadband	
Processing Census Block Coverage Area	• Load provided text files into excel. • Census block coverage excel sheet exported into dbf after adjusting column name (less than 11 characters). • Template of 2010 Census block < 2SQM joined with Technology 41 dbf file (Cable Modem - Other). • Census Block Coverage is loaded to Transfer Data model using append. • Result is stored in "BB_Service_CensusBlock".
Processing Service Overview	• Template County feature class is loaded into ArcMap. • Technology is calculated in each county. • County layer is loaded into Transfer Data model using append. • Result is stored in "BB_Service_Overview".

12-Level 3 Communications, LLC	
Processing Census Block Coverage Area	• Load provided text files into excel. • Census block coverage excel sheet exported into dbf after adjusting column name (less than 11 characters). • Template of 2010 Census block < 2SQM joined with Technology 41 dbf file (Cable Modem - Other). • Census Block Coverage is loaded to Transfer Data model using append. • Result is stored in "BB_Service_CensusBlock".
Processing Service Overview	• Template County feature class is loaded into ArcMap • Technology is calculated in each county. • County layer is loaded into Transfer Data model using append. • Result is stored in "BB_Service_Overview".

13- Mediacom Delaware LLC	
Processing Census Block Coverage Area	• Service address excel sheet Geocoded using ArcGIS online US geocoding Service. • Calculate Point Service address layer technology, speeds. • Load Point service address into "BB_Service_Address". • Select blocks using point service address, to determine block coverage. • Export block coverage. • Calculate, technology and speed for the block coverage. • Load the output into "BB_Service_CensusBlock".
Processing Service Overview	• Template County feature class is loaded into ArcMap. • Technology is calculated in each county. • County layer is loaded into Transfer Data model using append. • Result is stored in "BB_Service_Overview".

1.6 Map Creation/Interactive Web Application

An interactive web application was developed to enable the general public to view a map of Delaware's broadband availability in each of its three counties. Users will be able to see which forms of broadband exist in each area of the State and can also search for Providers by address. This web application is necessary in order to access and employ the data collected. In essence, the data collected is in a static state; this web application will move the data into dynamic, usable form.

With the creation of the web application, the State will move forward in meeting the requirements of this project's grant as outlined in the NOFA. The web application was created in a manner that honors the guidelines established in each NDA executed with each respective Provider. A publically accessible, interactive website is the best means by which the citizens/taxpayers can be informed of broadband availability and options. The applications serve as a hub of broadband coverage information. The resultant functionality is expected to improve service for several user groups. From a citizen standpoint, the application will serve as a gateway to access or improve access to broadband services. Citizens can use the application to gain knowledge of providers, technologies, and access level at their residence or place of business. Planners can use the site to aid in infrastructure construction plans to improve broadband access and capabilities to their assigned region of the State. The State Legislature will use the application to notify politicians of district relevant broadband capabilities and as a catalyst in policy making and a various array of legislative actions.

1.7 Backlab Verification

As the first version of maps covering each of the State's Providers was completed, the State Parties performed backlab verification of the data gathered and input onto the maps. This backlab verification included researching the Providers' websites to verify that the advertised speeds on the websites were consistent with those documented by the Providers as part of their submission to the State. In addition, the team made phone calls to some of the Providers to further verify service availability and speeds where necessary to gain the highest level of confidence in the data gathered.

1.8 Provider Review

After the backlab process was completed for each of the Providers, the data was sent back to the Providers for their review and acknowledgement of the data as being accurate. This phase of the project also allowed the Providers to update their data if changes had occurred since the intiatial gathering of data by the State Parties. Each of the Providers' data was pulled out from the aggregate data base prior to sending it to the Provider for their review. This ensured that the State Parties maintained the agreed-to confidentiality of each of the Providers' data.

1.9 Field Verification

The final step for the State Parties to verify the accuracy of the data was to perform a field verification process. Prior to beginning the original field verification activities in the summer of 2010, The State parties developed a field verification guide for use by each member of the field verification team. The guide included systematic instructions and a checklist related to verification of each broadband system, technology, and service type. The guide and checklist were drafted, reviewed by all State Parties, and finalized prior to the beginning of field verification activities.

To ensure uniformity of the team's approach to field verification, discussions were held with the Project Manager, and the Lead GIS Analyst and the field verification team immediately prior to the beginning of field verification activities in the fall of 2010.

The goal of field verification was revised from the original methodologies to only include verification of updated information from the providers in the State. For example, areas previously verified, which had no reported changes in technology or speed, were not re-verified as part of this round of verification.

New areas of broadband system coverage or where technologies and/or speeds changed from the previous submissions were verified by sampling whether services were available at various points shown on the Providers' system coverage maps that were randomly chosen from all of the census blocks that are within the Providers' systems. Points were chosen to represent areas throughout the Providers' new or upgraded service territory, including system boundary edges.

The State Parties team sample looked to provide a sampling of all broadband Providers who have made changes in coverage, technology or speed in the State, including large and small Providers across the State, being sure to include each of the three counties.

In December 2012, Team members spent a total of 5 days performing Field Verification functions including testing of cellular networks at more than 46 locations. In addition, the team performed approximately 110 speed tests of Cellular based wireless broadband provider networks.

1.10 Speed Tests

As part of the field verification process, State residents and businesses were given a business card-sized handout that briefly explained the project and pointed them to the state-specific speed test website. The State utilized a project-specific speed test web site[2] run by Ookla in order to gain Information on users' addresses, satisfaction, and the upstream and downstream speeds associated with their broadband connection. Ookla is a company that provides a private web-based reporting portal where customer-specific testing can be performed and documented over time. The results of the speed tests performed on the Ookla site are stored and available to the State Parties at any time.

Ookla tracks the end users' Provider name, technology of connection, downstream and upstream speeds, and other parameters such as IP address.

In addition, testing similar to that done by residents and businesses was performed by State Party representatives on four of the five major cellular-based broadband providers' networks. Cricket Wireless' network has not been upgraded since previous speed tests performed by the State Parties and therefore was not tested during this round of field verification. This again verified availability and speeds on each of the remaining four major cellular-based broadband Providers in the State where changes were reported on their data submissions. All speed test locations, to date, are shown on Attachment 3.

[2] http://www.delawarespeedtest.com/

Note: The Following Sections discuss data description and field verification for the fall 2012 data submittal. The spring submittal field verification will occur in spring 2013.

1.11 Presentation to the NTIA

The data submitted in the State Broadband Data and Development (SBDD) project is governed by the Notice of Funds Availability (NOFA) first published in volume 74, number 129, on page 32545 of the Federal Register and subsequently clarified in volume 74, number 154, on page 40569 of the Federal Register. According to the NOFA, an NDA may be executed with broadband Providers prior to data collection. The NTIA has proposed a National States Geographic Information Council (NSGIC) data model as a means to store the collected broadband data. The NSGIC model includes five main feature classes as follows:

1.11.1 Broadband Service by Census Block (Less than 2 square miles in area)

This feature provides the atomic unit for mapping provider services that, when tied to census demographic and socio-economic data, can provide guidance for the build-out and adoption of broadband. The Census Block feature class is generated by different methods, depending on the data submitted by the Broadband service Provider. The main methods for generating census block data are as follows:

- Broadband providers submit a list of served Census Blocks. In this case, the blocks are joined to the State's Census Block data to obtain its spatial location. Finally, the data are loaded into the Geodatabase model, and attributes are either transferred or filled in manually.
- Broadband Providers submit a list of end users. In this case, an overlay is needed between the submitted geocoded end user points and the State of Delaware Census Block feature class to obtain the list of Census Blocks.
- Broadband providers submit shape files or drawings with their boundary(s) of coverage. The boundary(s) is intersected by the Census Block feature class to obtain Census Block coverage.

1.11.2 Broadband Service by Census Block (greater than 2 square miles in area)

In order to provide a more granular representation of availability in Census Blocks larger than 2 square miles in area, these Census Blocks are described at a street segment level of detail.

There are two methods utilized to garner the data needed to generate street segment coverage maps. Depending on the data submitted by the providers, these methods can be summarized as follows:

- The broadband Provider submits a list of end user addresses. The nearest road segment is then selected, based on the attributes of the end user point.

- The broadband provider submits a shapefile or drawing showing their coverage area. In this case, street segments are selected based on the intersection of its coverage area and street segment feature class.

1.11.3 Broadband Service - Wireless

The maps of wireless technologies provide a representation of the expected, modeled, or field-verified service areas associated with wireless carriers, their service levels, and their utilized spectrums. The data in this feature class are generated based on a drawing (shapefile) submitted by a wireless technology service Provider (Terrestrial Mobile Wireless - Terrestrial Fixed wireless [licensed or unlicensed] - Satellite), as well as through field verification of wireless data.

1.11.4 Broadband Service - Overview

This feature provides a coarse view of speeds at a county level so that any regional or systematic patterns of service and speed can be assessed and mitigated.

The State of Delaware has three counties. The technology has been updated for each cable provider in a county level. Most providers were reluctant to provide pricing data, but some have provided data for weighted nominal speed.

1.11.5 Broadband Connection Points – Middle Mile

The purpose of broadband Connection Points, known as Middle Mile locations or points, is to give the locations and elevations of Interconnection points for service Providers working in the State of Delaware. Gathering infrastructure components (Middle Miles) helps leverage opportunities for network deployment after assessing gaps in broadband availability in the State.

The locations of Middle Mile points were provided by Providers either by their geographic coordinates (Latitude & Longitude) or by their street address(s), which are geo-coded to their spatial locations. Intersection between the Middle Mile points and Census block layer is needed to obtain Full Block ID (FULLFIPSID).

The above mentioned processes provided the State with the raw data to develop maps of the State showing where broadband is available, the maximum advertised levels of service, or speed offered to end users, and areas of the State that are unserved or underserved. This information will be updated every 6 months to show changes made by

Providers that will impact the broadband landscape throughout the State. This report details some of the most pertinent information derived from the project and can be utilized to help the State during its Broadband Planning Project currently underway.

2 Areas of Delaware Unserved/Underserved by Broadband Providers

One of the main objectives of the NTIA, the State of Delaware, GeoDecisions, and CBG was to determine where broadband is not currently available in the State of Delaware. Having areas where broadband is not available to potential end users helps create a phenomenon known as a Digital Divide. The Digital Divide is defined as the inability of residents to access broadband and Internet services based on economic, educational, or geographic reasons.

The NTIA defines an unserved area as: "An area composed of one or more contiguous census blocks where at least 90 percent of households in the service area lack access to facilities-based terrestrial broadband service, either fixed or mobile, at the minimum broadband transmission speed (set forth in the definition of broadband above). A household has access to broadband service if the household can readily subscribe to that service upon request."

Furthermore, the NTIA defines an Unserved Area as "A service area is defined as consisting of one or more contiguous census blocks, where half the households lack access to minimum broadband service, or an area where no land or mobile service offers broadband with at least 3 Mbps, or areas where less than 40% of households subscribe to any service."

To obtain information about where broadband is not available in the State, the State Parties performed the above tasks to determine where broadband is available in the State and where it is not available to potential end users. After determining where broadband is not available, the State is in the process of utilizing this information to determine what may be done to expand existing networks to provide service to these unserved areas or how new Providers may be enticed into building networks to serve these parts of the State. This is being undertaken by the State and the University of Delaware as part of their planning activities in the next phase of this project.

Although some services delivered by satellite-based Providers meet the requirement for broadband of 768 Kbps downstream and 200 Kbps upstream, for the purposes of this report, we have not included them when detailing broadband availability. While any location within the State is capable of receiving satellite based service as long as there is a clear unobstructed view of the southern sky, the reasoning for not considering satellite-based Internet here is that often times realized speeds on satellite-based networks fall significantly below 768 Kbps in the forward direction and 200 Kbps in the upstream direction. That being said, satellite Internet is an option for citizens and businesses in the State when other high speed connections are not available.

The State of Delaware has the 6th highest population density of the 50 states in the US. This helps the State's overall broadband availability in that broadband Providers are apt to serve high density areas because the cost to build a network is lower on a per-address passed basis. In other words, the amount of infrastructure needed to connect a given address to the Internet lessens as density increases. Conversely, the cost of building a network to more rural areas increases on a per-address (potential customer) basis to the point of not providing the broadband Provider the minimum potential return on their investment that they have established. Large companies have minimum potential customers per mile that must exist or they will not build infrastructure to an unserved area. For instance, a Provider may require a minimum of 20 homes or businesses be passed per mile of new infrastructure before they will build it. Some providers will require a minimum number of homes passed per mile, of new infrastructure, to be in excess of 30 homes. In rural areas, there may be as few as 1 or 2 homes per mile. Therefore, the area will not be built out.

Although the State of Delaware has a relatively small number of areas, and therefore citizens, that do not have broadband available to them, this should still be a concern for the State and its planning group. As in other locales, the State will likely find during its planning project that broadband is a driving force in many aspects of life today, including economic development, health care, all areas of business and institutional users, education, and entertainment to name a few. Consequently, the State will also likely find that encouraging expansion of broadband into the unserved areas of the State will have a positive impact on all of these aspects. Areas of the State that do not have access to broadband are shown on the map included as Attachment 1.

In addition to determining which areas of the State do not have access to broadband, demographics and socio-economic characteristics can be analyzed in areas of the State that do not have broadband availability. For instance, the State Parties have over-laid age, minority status, and income data onto the maps to determine which groups may be most impacted by the lack of broadband service in their areas. This information may prove valuable as the State's planning project moves forward. In addition, maps including other demographic and socio-economic characteristics can be created by the State Parties to show other groups that are impacted by the lack of broadband availability in areas of the State. The maps showing each of these parameters are included as Attachments 5, 6, and 7.

3 Areas of Delaware Served by a Single Broadband Provider

Similar to areas of the State that are unserved or underserved by any broadband Provider, the NTIA and the State desired to know what areas of the State are only served by a single Provider.

Areas that have a single broadband Provider imply that service is available in these areas but that there is no competition. Therefore, associated benefits that competition may bring, including lower pricing, higher speeds, and better customer service, are also not available in these areas. This project did not ask for or document any of these parameters, and therefore, other than speed and pricing information included in the Broadband Service Tiers – Residential, Business Governmental and Academia section of this report, they are not included in this report.

Similar to the unserved/underserved areas of the State, the State's high density makes it a good business decision for broadband Providers to build out the networks throughout most of the State since even with competition, these Providers can make a good return on their investment. As Attachment 2 shows, in addition to the areas of the State with no broadband availability, there are only a few small areas in the State that are not served by at least three Providers. Some of the areas served by fewer than two Providers include:

- The area northeast of Smyrna to Highway 9
- The area east of Hay Point Landing Rd
- The Bombay Hook National Wildlife Refuge area
- A small area east of Dover Air Force Base
- North of the Milford Wildlife Area
- The Prime Hook National Wildlife Refuge
- The area north east of Selbyville in Sussex county
- The area east of Laurel in Sussex county
- The area east of Farmington in Kent county

As a percentage, the areas of the State with fewer than two broadband Providers equates to less than 0.25% of the Census Blocks in the State. Furthermore, the estimated total number of households in the State that are not served by a broadband Provider is 1,029 or 0.25% of all households. This is based on the total number of homes in Census Blocks where broadband does not exist as an option to residents. However, as these areas are utilized by residents of the State and as housing and other developments reach these areas, they will not be broadband ready. The lack of broadband availability may hamper expansion into these areas as the need arises in the future.

4 Areas of Delaware Served by Multiple Broadband Providers

The large majority of the State of Delaware has multiple broadband Providers, serving addresses within the area, with over 50% of the State having six or more Providers of broadband service. When including all areas of the State with two or more broadband Providers, over 99% of the State's Census Blocks are offered broadband service by multiple Providers. A map of the State of Delaware with color codes showing the number of Providers is included as Attachment 2 to the report.

Having multiple Providers helps promote competition among the Providers in given areas and should translate into the highest level of speed the Providers can offer at affordable costs. Having multiple Providers in an area also promotes higher customer service standards from Providers as they attempt to keep their existing customer base and increase their numbers of customers.

5 Types of Technology Used to Provide Broadband in Delaware

The NTIA classified broadband technologies into 11 categories plus a 12th category labeled "All Other". These categories represent both hardline cable networks (cable, phone lines, or fiber optic infrastructure connected to the residence or business) and wireless networks (signals are transmitted to and from an address or location). The NTIA further defined each of the technologies into more specific categories. The technologies utilized in Delaware are listed and defined below:

- **Asymmetrical xDSL**
  DSL is a telephone system-based data communications service that utilizes modulation schemes that allow high-speed transmission of data on copper or phone lines. Asymetrical xDSL is a design characteristic where return speed is lower than forward speed. This allows for more of the network's bandwidth capability or throughput to be utilized by the forward portion of the network allowing for faster downloads than uploads. This technology is utilized widely by telephone companies in the State to provide broadband service to end users.

- **Other Copper Wireline**
  Non-DSL telephone system-based data communications service such as T-1 (1.54 Mbps). Other Copper Line technologies tend to be utilized more for business and anchor end users, as bandwidths are often gauranteed verses "up to" speeds.

- **Cable Modem – DOCSIS 3.0**
  A cable modem is a device that converts information from one device (computer) to a usable form for another device (cable TV network). Specifically, information from a computer is converted to a useable format for transport on the cable TV network and converted back to a format useable by a computer at the receive site modem. DOCSIS

3.0 provides for multiple channels on the cable TV system to be combined and the combination used to enable higher data communications speeds or bandwidths. DOCSIS 3.0 is widely utilized by cable television network-based Providers throughout the State. Cable TV systems currently utilizing previous versions of DOCSIS will likely migrate to DOCSIS 3.0 in the near term to utilize its higher bandwidth capabilities.

- **Cable Modem – Other**
  Similar to DOCSIS 3.0, except these are all prior versions and revisions of DOCSIS including 1.0, 1.1 and 2.0. These versions offer lower bandwidth or speed than DOCSIS 3.0. Only one Provider reported using Cable Modem – Other in the State. This Provider is primarily DOCSIS 3.0 and will likely migrate the remaining areas of the State from earlier versions of DOCSIS to DOCSIS 3.0 in the near future.

- **Optical Carrier/Fiber to the End User**
  A communications network utilizing fiber optics up to or into a household, business, or other facility – also called Fiber to the Home (FTTH) or Fiber to the Premise (FTTP). Fiber optic cables allow for transmission of modulated light along an optical fiber for significant distances. Fiber optic cables are utilized throughout communications systems due to their ability to transmit signals over longer distances with higher bandwidths, while having significant reductions in noise and distortion effects compared to other wireline and wireless networks. This technology is replacing other traditional telephone technologies throughout more densely populated areas of the State. The local phone company in these areas will likely phase out the traditional phone system over the long term.

- **Satellite**
  Wireless service provided between satellites and the end user. A dish-shaped antenna, similar to those used for satellite TV, is utilized at the end user's location to receive the downstream signal and to transmit the signal upstream. Satellite is available anywhere in the State where a clear view to the southern sky exists. Trees, buildings, and other obstructions are the only obstacles that may keep end users from accessing satellite internet.

- **Terrestrial Fixed Wireless – Unlicensed**
  Broadband service typically provided in a point-to-point configuration from a central tower location, or through a series of towers (hops) as part of a mesh network, to an end user location. The frequencies utilized are not licensed by the FCC and therefore are susceptable to interference or competition for bandwidth from other non-licensed networks. The only system to report utilization of Fixed Wireless – Unlicensed is located in and around the Rohoboth Beach area of the State. This is a WiFi-based system that requires a subscription and is password protected.

- **Terrestrial Fixed Wireless – Licensed**
  Broadband service typically provided in a point-to-point configuration from a central tower location, or through a series of towers (hops) as part of a mesh network, to an end user location. The frequencies utilized are licensed by the FCC and therefore are more immune to interference and competition for bandwidth from other networks.

- **Terrestrial Mobile Wireless**
  Broadband service typically provided in a point-to-multipoint configuration from multiple tower locations, as part of a mesh network, to end user locations. The mesh configuration allows for mobile access to the broadband network. These networks are most commonly known as cellular data networks. The frequencies utilized are licensed by the FCC and therefore are more immune to interference and competition for bandwidth from other networks. Terrestrial mobile based, or cellular, broadband is available throughout the State with the exception of a few areas. These are shown on the accompanying maps as unserved areas of the State.

6 Advertised Upstream and Downstream Transmission Speeds

Broadband Providers often advertise both downstream and upstream speeds as "up to" speeds. In other words, a Provider will advertise speeds "up to" 4 Mbps in the downstream direction and "up to" 1 Mbps in the upstream direction. Consumers may believe that those are the speeds they will most often realize when utilizing the Provider's network for internet access. However, in reality, the actual speeds offered on the network may be significantly less than the advertised "up to" speeds.

Many broadband networks deployed today utilize a shared bandwidth design whereby the network is developed based on customers sharing the total available bandwidth on the network. This is an effective way for a Provider to offer fast speeds to large areas while minimizing the amount of infrastructure needed and thereby reducing the cost of deployment. In many cases, this design provides speeds sufficient for most subscribers' needs that are well within the definition of broadband. However, the actual speeds will most often be lower than the advertised speeds because of the shared bandwidth design, and in some cases they will fall below the threshold stipulated for broadband.

An example of this is – if a network has a total available bandwidth equating to a download speed of 10 Mbps and one person is accessing the network, they will realize speeds at or near 10 Mbps. However, if 10 people are accessing the same network at the same time, they will divide the available network bandwidth among them. Although the actual results will vary, based on the level of utilization of bandwidth by each of the users, for purposes of this example, the result would be approximately 1 Mbps available to each of the 10 people accessing the network. In this example, we assume all 10 users are accessing significant amounts of bandwidth that may be required to download music, video, and large files or that may be required to watch live video. In reality, all 10 users will likely be utilizing differing levels of bandwidth at any given time. This phenomenon makes it difficult to evaluate advertised speeds within a given system, between systems, and throughout the State and beyond.

The Providers that supplied speed information, as verified during the backlab verification process, reported the following ranges of speed by technology:

- **Asymmetrical xDSL**

  Speeds between 768 Kbps to 25 Mbps in the downstream direction with speeds between 200 Kbps to 1.5 Mbps in the upstream direction[3].

- **Symmetric xDSL**

  Speeds between 768 Kbps to 6 Mbps in the downstream direction with speeds between 768 Kbps to 6 Mbps in the upstream direction.

- **Other Copper Wireline**
  Speeds between 768 Kbps to 25 Mbps in the downstream direction with speeds between 200 Kbps to 25 Mbps in the upstream direction.

- **Cable Modem – DOCSIS 3.0**
  Speeds between 50 Mbps to greater than 100 Mbps in the downstream direction with speeds between 10 Mbps to 25 Mbps in the upstream direction.

- **Optical Carrier/Fiber to the End User**
  Speeds between 50 Mbps to greater than 1 Gbps in the downstream direction with speeds between 10 Mbps to greater than 1 Gbps in the upstream direction.

- **Satellite**
  Speeds between 768 Kbps to less than 25 Mbps in the downstream direction with speeds between 200 Kbps to less than 3 Mbps in the upstream direction.

- **Terrestrial Mobile Wireless**
  Speeds between 768 Kbps to 25 Mbps in the downstream direction with speeds between 200 Kbps to 6 Mbps in the upstream direction.

[3] These speeds have decreased from previous submissions based on providers' updated data.

7 Samples of Actual Upstream and Downstream Transmission Speeds

Several methods were used to obtain a sampling of the actual broadband transmission speeds achieved by residents, businesses, and institutions[4]. For example, State residents and businesses were given a business card-sized handout that briefly explained the Project and pointed them to the State-specific speed test and survey website. This round of verification focused on areas of the State where providers have reported new technologies and speeds compared to previous data submissions. The State utilized a Project-specific Ookla speed test website[5] and survey in order to gain information on users' addresses, satisfaction, and the upstream and downstream speeds associated with their broadband connection. In addition, the State Parties' team members performed more than 110 speed tests, on wireless networks. The locations of these speed tests are included on Attachment 3.

Another verification method, in addition to utilizing the above-mentioned methodologies for verifying system coverage and characteristics, was for team members to enter into discussions with residents in the area. Residents were asked if they knew if a particular Provider's service was available, if they were or had recently been a customer, and if they know what speeds they could achieve. Residents often times did not know what their service level and speeds were but did know who the broadband service Provider was. In December 2012, approximately 50 speed test cards were handed to residents and at business locations such as business strip malls. These cards encouraged the residents to visit the State speed test and survey website, as listed on the card, to assist the State in gathering actual speed data. Prior to this, approximately 3,300 speed tests were performed by both State Party team members on site and residents and business personnel at their locations throughout the State at locations with broadband speeds of at least 768 Kbps in the forward and 200 Kbps in the return direction. In addition to the 3,300 speed tests mentioned, several hundred speed tests were performed showing less than broadband speeds being achieved.

It should be noted that there are many variables that can affect speed test results. Of these, the most significant are the technology reportedly utilized and the performance characteristics of the computer or device being utilized by the end user performing the test, the number of computers or devices at a location accessing the internet at the same time, the level of throughput being utilized by each, and the day and time of day when the tests are performed. For these reasons, speed tests are best analyzed in the aggregate to give a good understanding of typical speeds being realized. In other words, all cellular tests should be averaged to get an accurate understanding of actual speeds that can be expected from that given technology. Furthermore, speeds for a given Provider can be averaged to again get a better understanding of the actual speeds available from that Provider.

[4] This information will be updated after the spring 2013 field verification tasks.
[5] http://www.delawarespeedtest.com/

Of the nearly 3,300 speed tests performed before December 2012, providing broadband speed results, the overall average speeds of all technologies and Providers) were approximately 6.8 Mbps downstream and 3.0 Mbps upstream. Further broken down by technology, the average speeds are shown in the table below. It is important to note that some of the test broadband technology may be categorized incorrectly by the speed test results, and that these results should be verified in the future.

Technology	Downstream	Upstream
All Technologies Combined	6.8 Mbps	3.0 Mbps
Mobile Wireless	1.5 Mbps	550 Kbps
Cable Modem – Residential	10.7 Mbps	3.2 Mbps
Cable Modem – Business class	11.6 Mbps	3.3 Mbps
DSL	10.3 Mbps	4.4 Mbps
Fiber To The Premises/Business	23.9 Mbps	14.0 Mbps

As described above, these are aggregate numbers that represent an average of these tests taken by end users. Actual speeds at a given location will vary from these speeds. Overall, the speed tests indicate speeds comparable to those advertised by the providers. For example, mobile wireless providers offer speeds between 768 Kbps to 15 Mbps (some offer a lower maximum speed) in the downstream direction. The speed tests show an average speed of 1.5 Mbps in the downstream direction. Cable modem DOCSIS 3.0 is advertised to offer speeds between 3 Mbps and 105 Mbps. The average tested speed was 10.7 Mbps. This is on the low end of what is advertised and may reflect end users with a lower than maximum speed plan. In other words, although speeds up to 105 Mbps may be offered to residential end users, many may be signed up for a service with a maximum throughput of 20 Mbps or less, which brings the aggregate average speed for cable modem DOCSIS 3.0 down. Fiber to the premise is similar to cable modem DOCSIS 3.0 in that the tested speeds are lower than the advertised maximum speeds of between 50 Mbps and 1 Gbps (300 Mbps). These higher end speeds are more costly and therefore not likely to be the highest selling tier of service. Therefore, the speed tests done on the lower tiered service will bring the overall aggregated average speed down from the advertised "up to" speeds. DSL service is the only technology that had tested aggregated average speeds near the top of the advertised maximum speed range. In fact, the advertised maximum speeds for DSL are between 768 Kbps and 10 Mbps, and the tested speeds for DSL came in at 10.3 Mbps.

8 Broadband Service Tiers – Residential, Business and Anchor Institutions

One of the goals of the project was to find the maximum downstream and upstream speeds offered by the various Providers in the State. The goal was not to determine the various levels of service or speed being offered but rather the maximum level of service offered by the Providers. However, speed tiers or levels are an important component of determining what services are available to end users, as many will not require or be able to afford the fastest available speeds but do want or need a higher speed connection than is available via a dial-up connection.

Broadband service is provided in many different speed tiers through the various technologies. Most Providers offer more than one level of service or speed whereby end users who need or desire faster connectivity can opt for the highest level of service, and end users who only need lower levels of service can elect to purchase a slower connection at a reduced cost. Speed tiers differ considerably between Providers and are dependent on the technology utilized to provide the service. For instance, Providers using cable modem DOCSIS3 technology offer maximum speeds of between 10 Mbps to 105 Mbps in the downstream direction, while mobile wireless Providers in the State offer maximum downstream speeds on 4G networks as high as approximately 17 Mbps (4G networks are capable of higher speeds but because they are shared networks the advertised rates are lower).

Making exact comparisons between broadband service Providers is difficult for a variety of reasons, the most significant of which is that most Providers offer "up-to" speeds. As an example, an end user on one Provider's network with "up-to" speed of 1.5 Mbps may realize close to that maximum speed at most times. However, a customer on another Provider's network with "up-to" speed of 1.5 Mbps may only realize half of that speed at most times. This makes it difficult to accurately determine which Provider has the speeds that will consistently provide the level of service needed by the end user. Other issues that can make shopping for a broadband Provider difficult are introductory pricing, bundled pricing (where broadband service must be purchased with another service such as phone or TV) and long-term contracts. Introductory pricing may provide a benefit in the short term, while offering less competitive pricing in the long term. Long-term contracts can lock an end user into a plan they may not need over the course of the contract term or lock them into a plan that does not fulfill their needs in the future. Additionally, some Providers such as mobile broadband and satellite services have established throughput limits. These limits are as low as 250 MB per month with higher limits for a higher monthly fee. After a customer hits that level of throughput, they may be charged additional fees or their service level is cut back significantly for the remainder of the month (such as is done by some satellite based Providers).

Providers are also continually changing their service offerings and pricing. As end users needs for speed continue to increase, Providers continue to offer higher levels of speed with new additional features as discussed elsewhere in this report. Another aspect that must be considered by potential end users is installation, equipment, and activation fees. These can

vary from $0.00 to well over $300.00. Many Providers that require installation or equipment fees run promotions where these fees are waived or reduced for a limited time.

Other add-ons or extras, which may or may not offer value to the end user, that some Providers offer as a part of their service are security tools such as anti-spam and anti-virus software, home networking, specific web content free such as Disney, ESPN3, and others.

Some examples of available plans and non-introductory, non-bundled pricing as researched on Providers' websites include the following:

Cable Modem Providers (all "up-to" speeds)		
Downstream Speed	Upstream Speed	Price per Month
3 Mbps	512 Kbps	$29.95
3 Mbps	768 Kbps	$39.95
6 Mbps	1 Mbps	$49.95
15 Mbps	1 Mbps	$49.95
20 Mbps	2 Mbps	$59.95
20 Mbps	4 Mbps	$62.95
50 Mbps	10 Mbps	$74.95
105 Mbps	10 Mbps	$99.99
105 Mbps	20 Mbps	$114.95

Fiber To The Premise (FTTP all "up-to" speeds)		
Downstream Speed	Upstream Speed	Price per Month
15 Mbps	5 Mbps	$69.99
50 Mbps	25 Mbps	$79.99
75 Mbps	35 Mbps	$89.99
150 Mbps	65 Mbps	$99.99
300 Mbps	65 Mbps	$209.99

Satellite (all "up-to" speeds)		
Downstream Speed	Upstream Speed	Price per Month
12 Mbps	3 Mbps	$49.99 - $129.99*
10 Mbps	1 Mbps	$59.99
10 Mbps	2 Mbps	$79.99
15 Mbps	2 Mbps	$99.99
* Prices based on amount of throughput used per month		

Mobile Wireless (all "up-to" speeds)		
Downstream Speed	Upstream Speed	Price per Month
3G	3G	$14.99 for 250 MB
3G/4G	3G/4G	$50.00 for 5 GB
4G	4G	$14.99 per 250 MB
4G	4G	$50.00 for 4GB

DSL (all "up-to" speeds)		
Downstream Speed	Upstream Speed	Price per Month
1 Mbps	768 Kbps	$19.99
3 Mbps	768 Kbps	$29.99
7 Mbps	768 Kbps	$29.99
15 Mbps	768 Kbps	$29.95

Fixed wireless (Licensed all "up-to" speeds)		
Downstream Speed	Upstream Speed	Price per Month
1.5 Mbps	500 Kbps	$49.99
6 Mbps	1 Mbps	$34.99

As the tables above show, shopping for the plan that meets the specific, consistent needs of an end user can be confusing. Many other options and additional features are offered by Providers that are not shown in the examples above, including virus protection, spam filters and pop-up blockers, and subscription only websites. In addition, end users must decide if long-term commitments are a concern for them prior to signing up for many types of broadband service offerings.

Some Providers such as the cable modem, DSL, and wireless Providers also offer business class service. These services may be identical to residential service with additional add-on services, such as Outlook for e-mail, and may include a higher level of, or faster, service response when problems arise.

In addition, some Providers offer faster speeds as business class service at a higher monthly cost. These Providers also will offer business class and residential class services to Anchor Institutions. Some Providers will offer higher speeds on a per site basis, such as fiber optic connections, with speeds as high as 1 Gbps symmetrical (or higher) such as those supplied to the cities of Dover and Wilmington and the University of Delaware.

As shown below in the Broadband Availability at Anchor Locations section, Anchor locations' requirements vary significantly based on their size, the number of internet users, and the applications being run at the location. Costs will vary on these services based on speed and necessary infrastructure expansions needed to connect the Anchor Institution.

9 Locations of Towers Utilized to Provide Broadband

During the previous Field Verification portion of the project, the State Parties noted the locations of towers that are utilized by cellular Providers and for other radio communications.

These locations have been plotted onto a map for potential future reference. These locations can serve as transmit and receive sites for wireless broadband Providers. As a potential wireless Provider evaluates whether to deploy a network to offer broadband to residents and businesses, one of the most significant costs can be construction of a tower that is high enough to provide service to the surrounding areas. These existing towers may have space available that can be leveraged for placement of broadband related antennas at a significantly lower cost than building new towers and therefore may allow a Provider to deploy a network where one may not otherwise exist. The available space must be at a height on the antenna that will meet the needs of a new occupant on the tower. Furthermore, like any business, the Provider must recoup their investment over a set period of time. Using a lower cost option such as existing towers may allow a Provider to offer service at a lower monthly cost to the end user.

The goal during the initial Field Verification phase of the project was to document all towers passed while performing the more pertinent task of verification of broadband availability where the Providers indicated service was available. This process did not identify all towers in the State but does provide a useful database that can be built upon over time. The Towers that were located are shown on the map included as Attachment 4.

10 Wireless Spectrums Utilized to Provide Broadband

Several wireless frequency spectrums are being utilized by the various wireless Providers to offer broadband service. These include both fixed and mobile wireless Providers. As part of the data request sent to all of the Providers, they were asked to include which frequencies they are utilizing to offer broadband service in a wireless format. The spectrums utilized, as reported by the Providers, are as follows:

Cellular Providers are using several spectrum ranges including:

- 700 MHz band
- 698 – 758 MHZ
- 775 – 788 MHz
- 805 – 806 MHz
- 824 – 849 MHz
- 862 – 869 MHz
- 1.850 – 1.915 GHz
- 1.930 – 1.995 GHz
- 1.710 – 1.755 GHz
- 2.100 – 2.155 GHz
  2.496 – 2.690 GHz

Satellite Providers are using licensed frequencies as provided by the FCC in the L-band, Big LEO, Little LEO, and 2 GHz spectrums.

11 Broadband Availability at Anchor Locations

The NTIA's NOFA required that "Awardees shall provide NTIA with a list of community anchor institutions in their state, along with the associated information described below." The information gathered includes address data, Provider name, technology, and speeds of broadband connection. The NOFA defined Community Anchor Institutions (CAIs) in the following manner: Schools, libraries, medical and healthcare Providers, public safety entities, community colleges and other institutions of higher education, and other community support organizations and entities.

The State tasked the Institute for Public Administration at the University of Delaware (IPA) with performing the tasks of gathering the information needed related to Anchor Institutions.

The IPA first compiled a master list of all CAIs throughout the State. This list was then subdivided into categories of:

- Schools – K-12 (public and private)
- Libraries
- Medical/Healthcare facilities (public and private)
- Public Safety entities (public and private)
- Universities, colleges and other post-secondary (public and private)
- Other community support – governmental
- Other community support – non-governmental

The IPA verified each CAI's name, street address, map coordinates, and proper categorization into the above groups. A few of the small municipalities only have Post Office boxes on file for addresses and were therefore mapped with the Post Offices' mailing address.

The previous list of known CAIs in the State, as reported in September 2012, totaled 901. Through the process of making follow-up contacts and obtaining additional CAI lists to identify the level of Internet connectivity the CAIs were utilizing, a March 2013 adjusted total of 903 CAIs was determined. The IPA has been able to elicit usable responses from 644 of those 903 CAIs. Of that subset of 644 respondents, 627 do have broadband connections, while 17 report that they do not have broadband. The remaining 259 CAIs have been non-responsive, to date. The IPA continues to attempt to make contact with the CAIs that have not yet been included in the study.

627 of the 644 CAIs that have been responsive to date—about 97%-- reported they have some level of broadband connectivity to their Internet Service Provider (ISP). This leaves just about 3% of respondent institutions that indicated a lack of broadband connectivity.

The breakdown of all known CAIs is as follows:

- Schools – K-12 (public and private)
  Total = 391
  With Broadband = 276
  Without Broadband = 3
  Non-responsive = 112

- Libraries
  Total = 33
  With Broadband = 33
  Without Broadband = 0
  Non-responsive = 0

- Medical/Healthcare facilities (public and private)
  Total = 30
  With Broadband = 23
  Without Broadband = 0
  Non-responsive = 7

- Public Safety entities (public and private)
  Total = 120
  With Broadband = 77
  Without Broadband = 1
  Non-responsive = 42

- Universities, colleges and other post-secondary (public and private)
  Total = 32
  With Broadband = 22
  Without Broadband = 1
  Non-responsive = 9

- Other community support – governmental
  Total = 70
  With Broadband = 60
  Without Broadband = 6
  Non-responsive = 4

- Other community support – non-governmental
  Total = 227
  With Broadband = 136
  Without Broadband = 6
  Non-responsive = 85

The speeds achieved by the CAIs vary considerably overall; there are also significant differences within categories of CAIs. For example, of the 276 K-12 schools that reported having broadband connectivity, 205 reported the use of Optical Carrier/Fiber with downstream and upstream speeds of 10 Mbps or greater; 15 reported the use of Cable Modems and 36 reported the use of Other Copper Wireline – with widely varying downstream speeds and upstream speeds in both cases; while 5 reported a reliance upon DSL connections (12 schools indicated that they had broadband connectivity but were unresponsive regarding any specifics concerning the technology being utilized). Among the libraries (all of which are on the State network and use Optical Carrier/Fiber), 3 reported downstream and upstream speeds in the range of 100 Mbps - 1 Gbps, while the other 30 reported downstream and upstream speeds in the range of 10 Mbps - 25 Mbps. The highest downstream and upstream speeds of any CAIs (greater than or equal to 1Gbps in both directions, using Optical Carrier/Fiber) were reported by the Delaware Special Olympics, the cities of Dover and Wilmington and the University of Delaware. Of all the entities that did indicate they had broadband service, the slowest connections were reported by non-governmental community support institutions (typically Senior Centers), some of which were using DSL connections with downstream speeds as low as 768 Kbps - 1.5 Mbps and Upstream speeds of 200 Kbps or less.

In addition to determining if CAIs have broadband, the data collection for March 2013 addressed whether the CAI provides public access to WiFi. In the case of Delaware's libraries, the availability of public access to broadband via terminals far outweighs the availability of Public Wifi— while all 33 of the libraries do provide public access to broadband, only 14 reported the capability to provide public WiFi in March 2013. System-wide availability of public WiFi at Delaware libraries was, however, reported as in the process of implementation.

By allowing public access to broadband, CAIs can help serve populations in the State that otherwise may not have broadband access available to them. These include people living in unserved or underserved areas of the State or who cannot afford access at their residence. IPA plans to focus on these CAIs in its planning activities to determine how such facilities best meet the needs of population groups that do not otherwise have access.

12 Conclusion

The State of Delaware, with direction and grant funds from the NTIA, began the process of determining the level of broadband availability in the State of Delaware in early 2010. As components of the project, Providers were asked to provide data detailing where they provide broadband service, the advertised maximum downstream and upstream speeds, and the technology deployed to offer the service. The data gathered from the Providers was verified using multiple methods, including checking the data against websites; field verification and speed tests by State Party team members and the general public. The data was then sent to the Providers for one final check for accuracy. The State has now completed its 7th submission or version of the project with updates being included in the data base each time.

Because, in part, the State has a relatively high population density, broadband providers offer service throughout much of the State. Additionally, in more than 53% of the State more than six different Providers offer broadband in the same areas. Over 99% of the State has broadband service availability from at least two Providers.

There are several technology types being utilized in the State to provide broadband to residents, businesses, and Anchors. These vary from telephone-based technologies such as asymmetrical and symmetrical DSL and other copper wireline to cable-modem based technologies, optical carrier or Fiber-To-The end user, satellite, and mobile wireless. Each of the technologies brings broadband to end users in different ways and fills various needs such as speed, price, reliability and mobility.

Determining and documenting speed offerings can be a complicated task. Most broadband providers offer "up to" speeds. The actual speeds of these networks at a given time may vary drastically from the "up to" speed that is advertised. In addition, Providers often include other services such as virus protection, anti-spyware, and others or require a customer to bundle their broadband service with other services such as phone or TV to get the best price. Consumers need to weigh all aspects of the Providers' service prior to signing up for service and potentially signing a long-term contract.

As a part of the Project, the State Parties documented existing cellular and other communications towers throughout the State. These locations may provide a potential cost reduction for future broadband providers to enter the broadband marketplace.

This may allow the State to encourage build out of existing wireless networks or deployment of new networks where broadband service is lacking today.

The Institute for Public Administration at the University of Delaware (IPA) has had contact with 644 of the 903 known Anchor Institutions in the State. Of these, only 17 do not have broadband service today. The State should continue to make efforts to contact the Anchors that have not responded thus far. The State should then work with the Anchors during its Planning Project to determine if the broadband services available to the Anchors are meeting their needs today, as well as being able to meet their anticipated short- and long-term needs in the future.

The State can utilize availability documentation gathered and updated throughout this Project to continue to help direct the Planning Project that is currently underway. During the Planning Project, the State and the University of Delaware's Institute for Public Administration will determine broadband-related needs of the general public, businesses, and Anchor Institutions throughout the State in today's environment as well as into the future.

13 Glossary of Terms

Access Point (AP) – Transmitter and receiver utilized to create a wireless connection between devices. End users connect wirelessly to the network via an Access Point.

Asymmetrical Speeds – A network system design characteristic where return speed is lower than forward speed. This allows for more of the network's capability or throughput to be utilized by the forward portion of the network allowing for faster downloads than uploads.

Broadband – (as defined in the NTIA's NOFA) – Data transmission technology that provides two-way data transmission to and from the Internet with advertised speeds of at least 768 kilobits per second (Kbps) downstream and at least 200 Kbps upstream to end users, or providing sufficient capacity in a middle mile project to support the provision of broadband service to end users within the project area.

BPL (Broadband-Over Powerline) – A network utilizing electrical conductors (a power Provider's lines) as its transport medium.

Cable Modem – A device that converts information from one device (computer) to a usable form for another device (cable TV network), i.e., Information from a computer is converted to a useable format for transport on the cable TV network and converted back to a format useable by a computer at the receive site modem.

Community Anchor Institutions – Schools, libraries, medical and healthcare Providers, public safety entities, community colleges and other institutions of higher education, and other community support organizations and entities.

Digital Divide – The inability of residents to access broadband and Internet services based on economic or geographic reasons.

Digital Subscriber Line (DSL) – A telephone system-based data communications service that utilizes modulation schemes that allow high-speed transmission of data on copper or phone lines.

Downstream, also known as "download" or "forward direction" – Connectivity path from a network service Provider, or ISP, to the customer's location.

Fiber Optic Cable – Cable made from glass that provides the medium for transmission of light along a designated path. Single mode fiber is utilized to transport light over long distances.

Fiber To The Premises (FTTP) – A communications network utilizing fiber optics up to or into a household, business or other facility, also called FTTH or Fiber To The Home.

Fixed Wireless – Broadband service typically provided in a point-to-point configuration from a central tower location, or through a series of towers (hops) as part of a mesh network, to a customer premise location.

Gigabits per Second (Gbps) – One billion bits of information transmitted between devices in one second, i.e., 1 Gbps = 1,000,000,000 bits of information transported over a network per second.

Internet Protocol (IP) – Internetworking protocol used to transmit data across and between switched networks. Also specifies the formatting and addressing scheme of information packets.

ISP – Internet Service Provider – Private company or other organization offering connectivity to the Internet.

Kilobits Per Second (Kbps) – One thousand bits of information transmitted between devices in one second, i.e., 256 Kbps = 256,000 bits of information transported over a network per second.

Megabits per Second (Mbps) – One million bits of information transmitted between devices in one second, i.e., 1.5 Mbps = 1,500,000 bits of information transported over a network per second.

Middle Mile/Backbone/Backhaul – Transmission media utilized to connect APs or network nodes within a system to each other and to the main network and to the Internet. Backhauls can consist of fiber optic cables, WiMAX, and other wireless technologies.

Symmetrical Speeds – A system design characteristic allowing equal speeds in the forward and return paths of the network.

Upstream – Also known as "upload" or "return direction" – Connectivity from the customer back to the network service Provider or ISP.

Voice over IP (VoIP) – Transmission of voice communications as IP packets, allowing for transportation of voice over the Internet, LANs and WANs.

Wi-Fi (Wireless Fidelity) – Wireless local area networks based on the IEEE's (Institute of Electrical and Electronics Engineers, Inc.) 802.11 standards. 802.11 refers to a group of standards in place today as well as standards that are currently being developed.

WiMAX (**Worldwide Interoperability for Microwave Access)** – Wireless wide area networks based on the IEEE's 802.16 standards. Capable of transmission speeds up to 70 Mbps over 70 miles with actual speed and coverage far less based on applications and terrain.

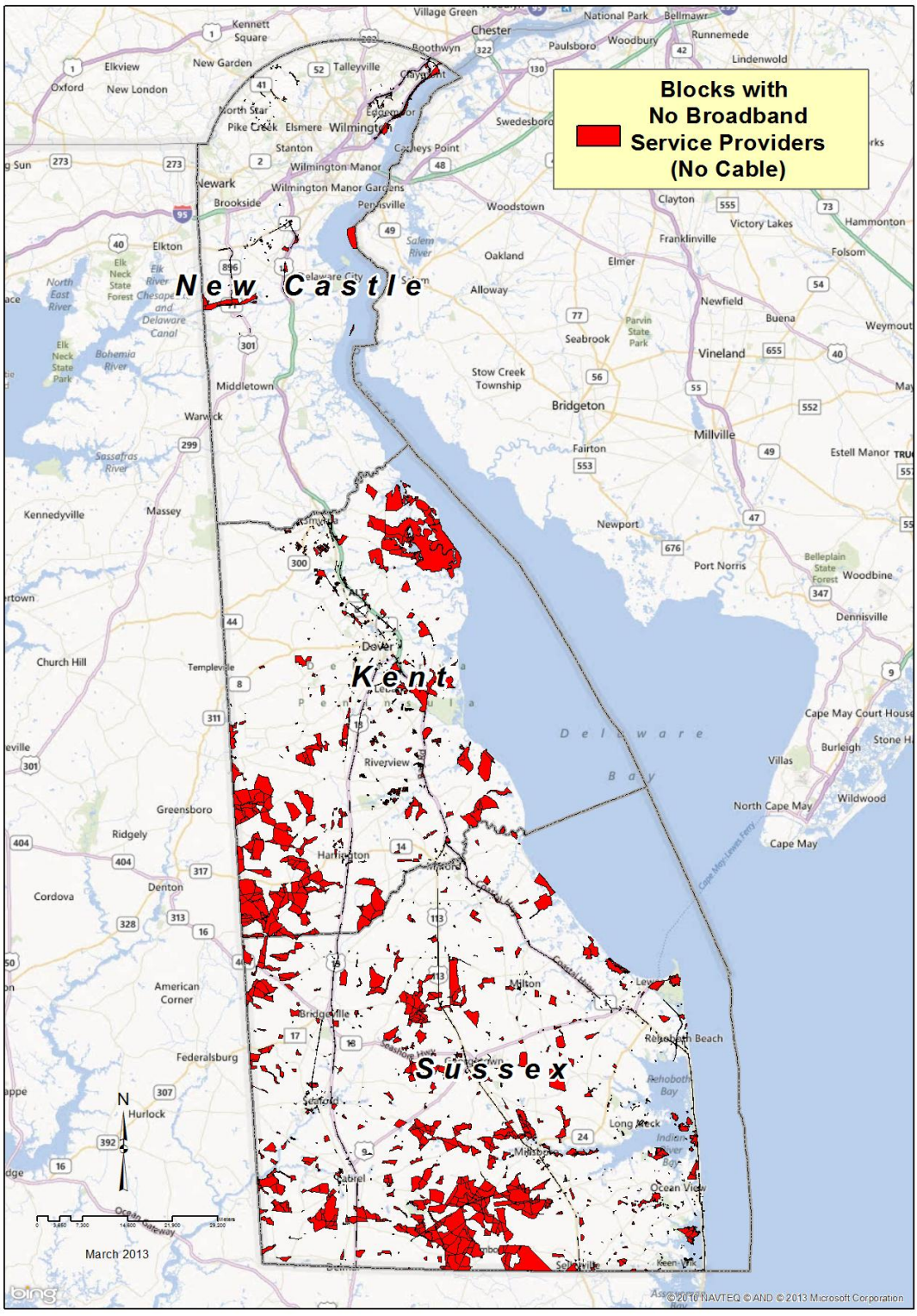
Version Information

Version Num.	Edit Date	Edited By	Comments
0.1	12/07/10	Nielsen, Robinson	Draft Document
1.0	12/10/10	Jensen, Conway	Draft Document Revisions
1.1	04/26/11	Jensen	Spring 2011 Updates
1.2	06/13/11	Tuttle	Updated 2011 Anchor Stats
2.0	09/22/11	Cloud	Updated 2011 CAI Stats for Fall submission from UD-IPA
2.1	01/25/12	GeoDecisions	Fall 2011 Updates
3.0	03/20/12	GeoDecisions	Spring 2012 Updates
3.1	03/29/12	Cloud	Minor edits, Updated CAI Stats for spring submission from UD-IPA
4.0	03/28/13	GeoDecisions Team	Spring 2013 Updates

Attachments

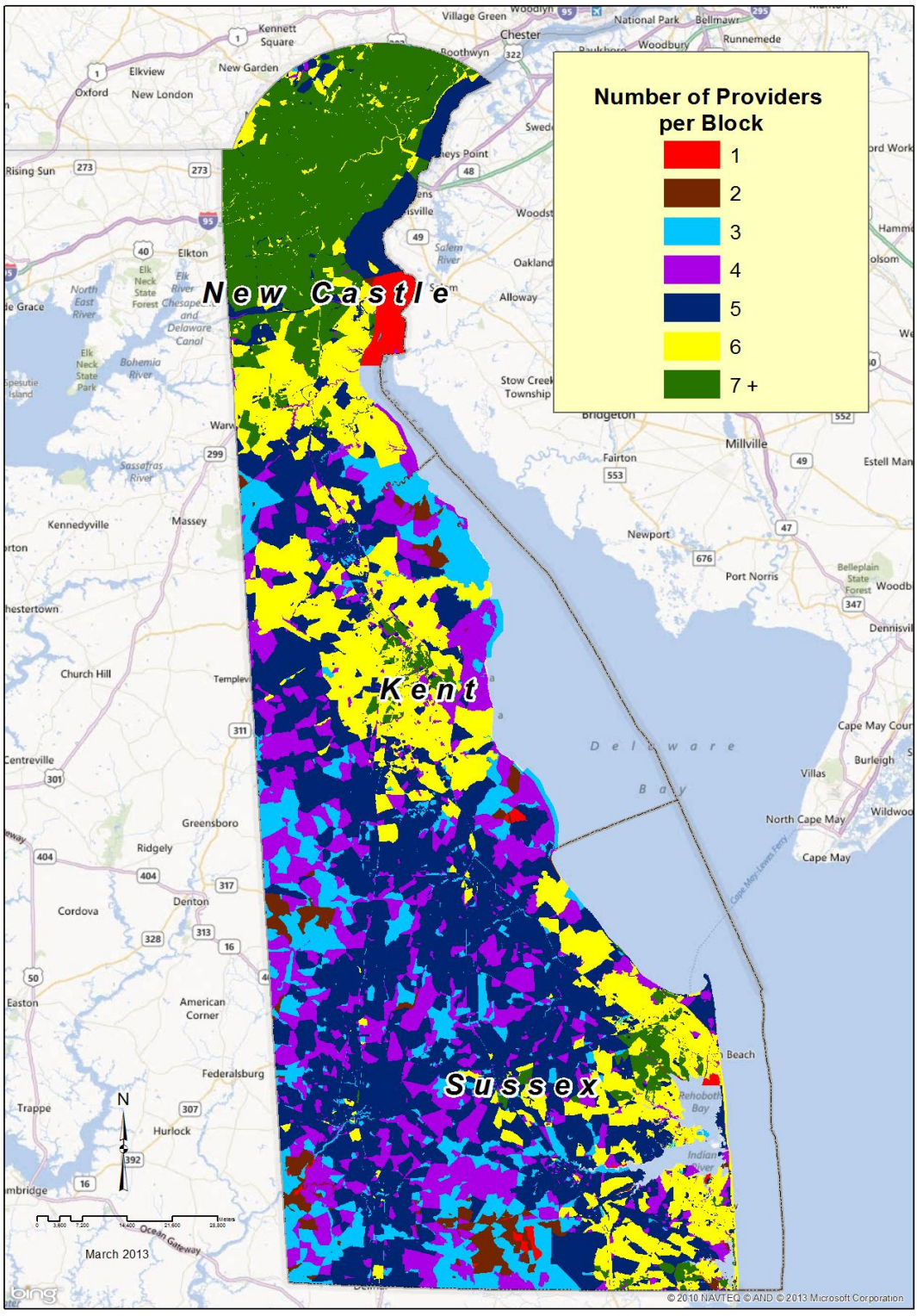
Attachment 1

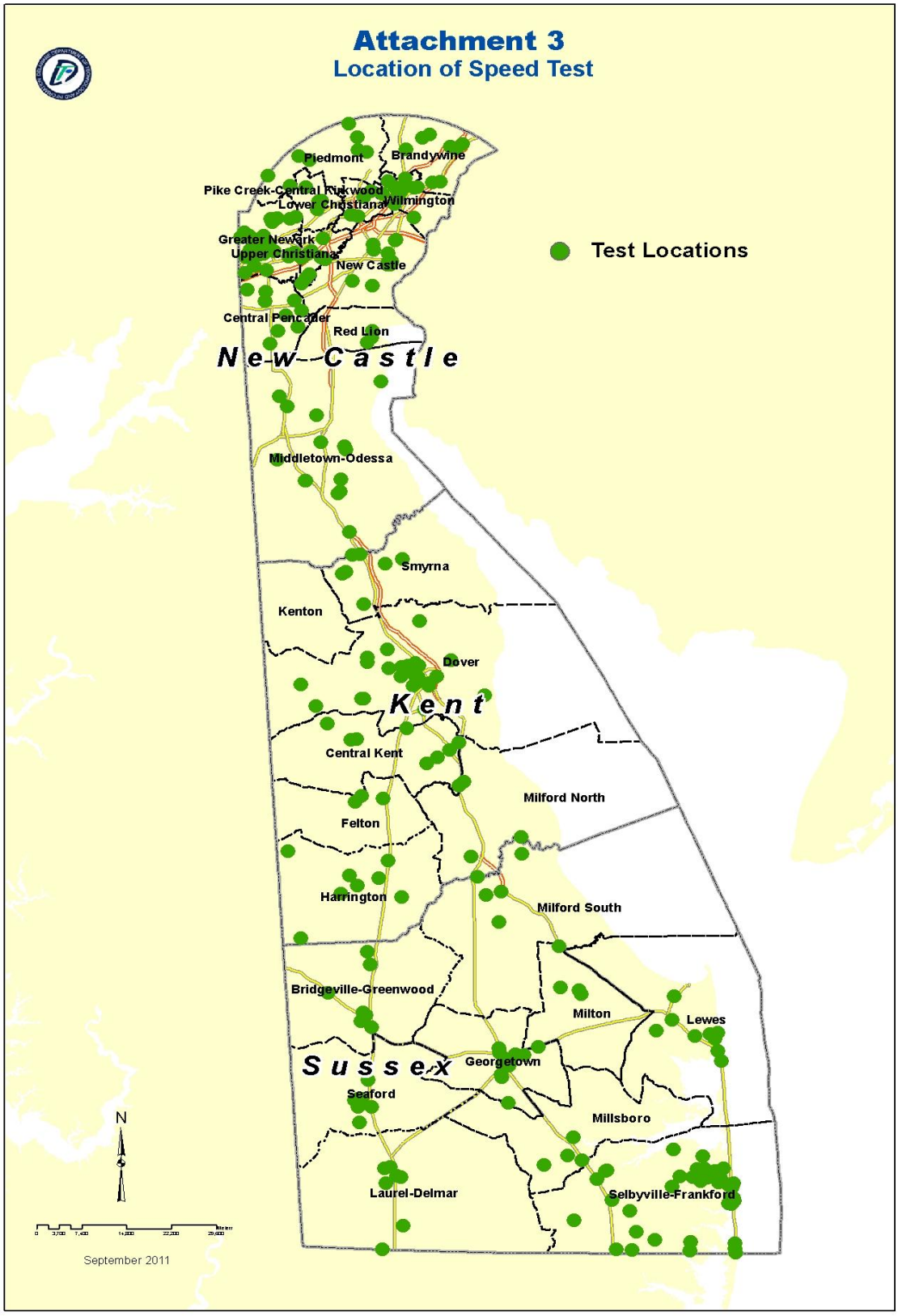
Areas with No Access to Broadband



Attachment 2

Number of Broadband Providers per Block




Attachment 3
Location of Speed Test
Test Locations
Piedmont
Brandywine
Pike Creek-Central
Kirkwood
Lower Christiana
Wilmington
Greater Newark
Upper Christiana
New Castle
Central Pencader
Red Lion
New Castle
Middletown-Odessa
Smyrna
Kenton
Dover
Kent
Central Kent
Milford North
Felton
Harrington
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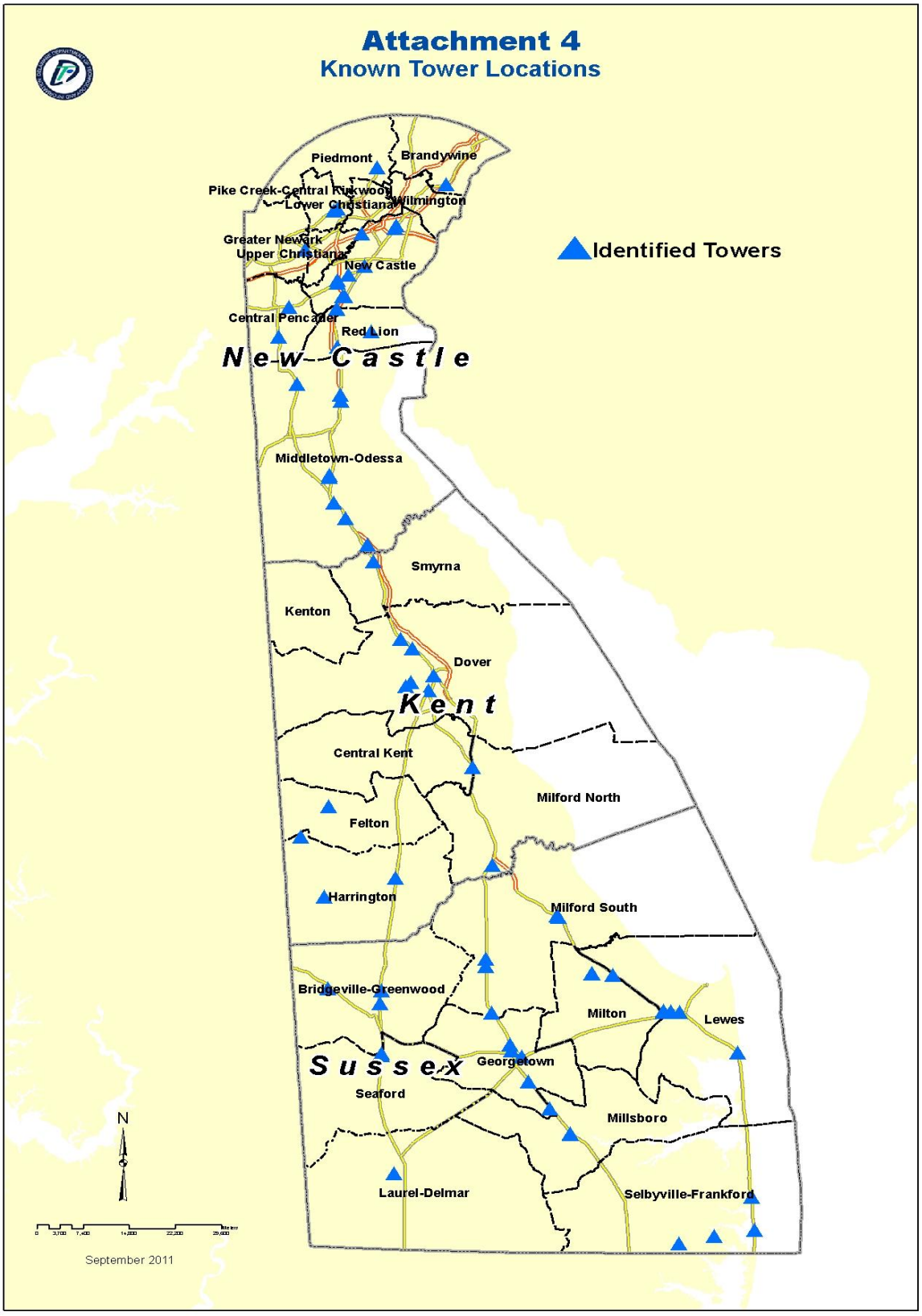
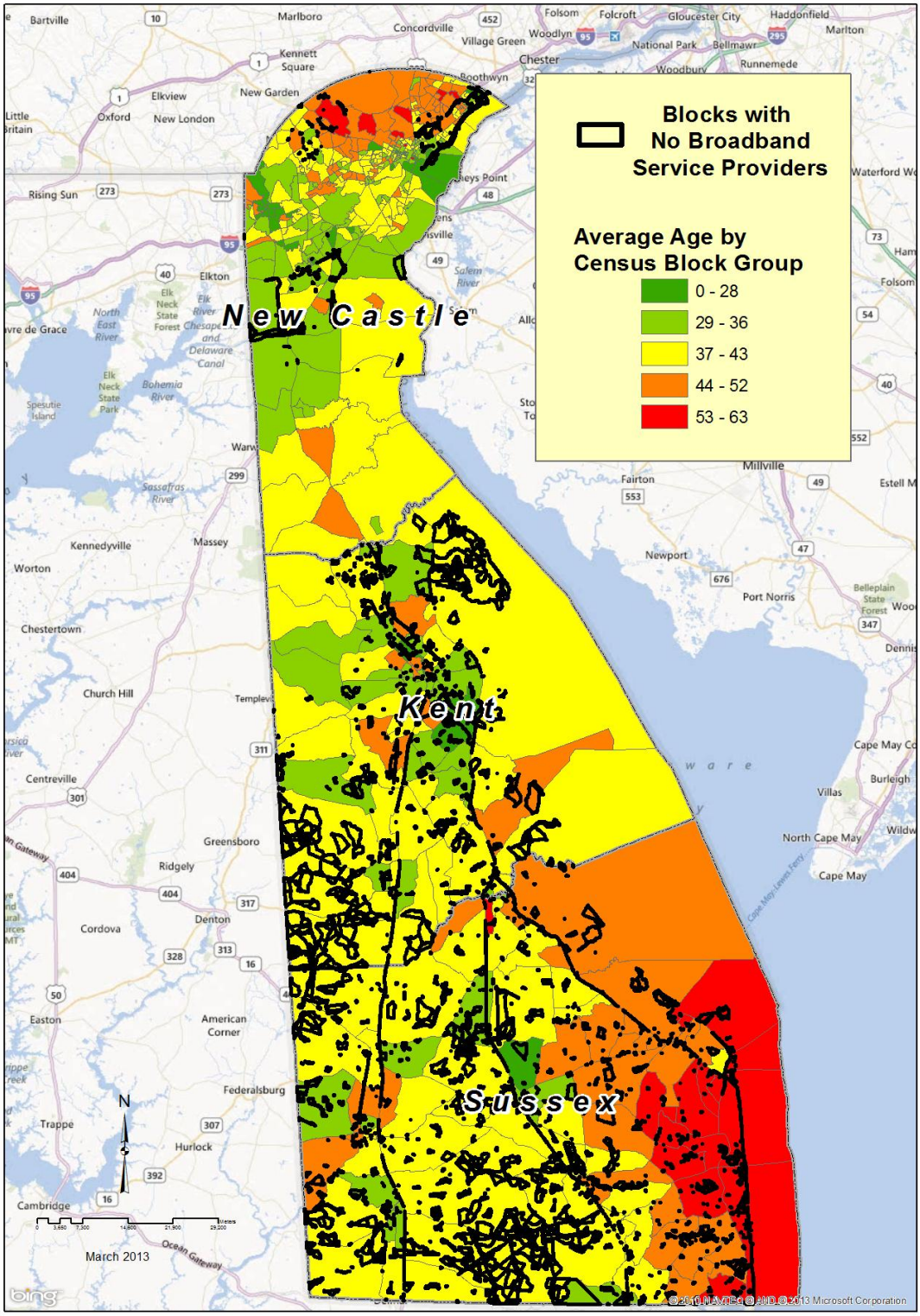
Laurel-Delmar
Selbyville-Frankford
N
September 2011

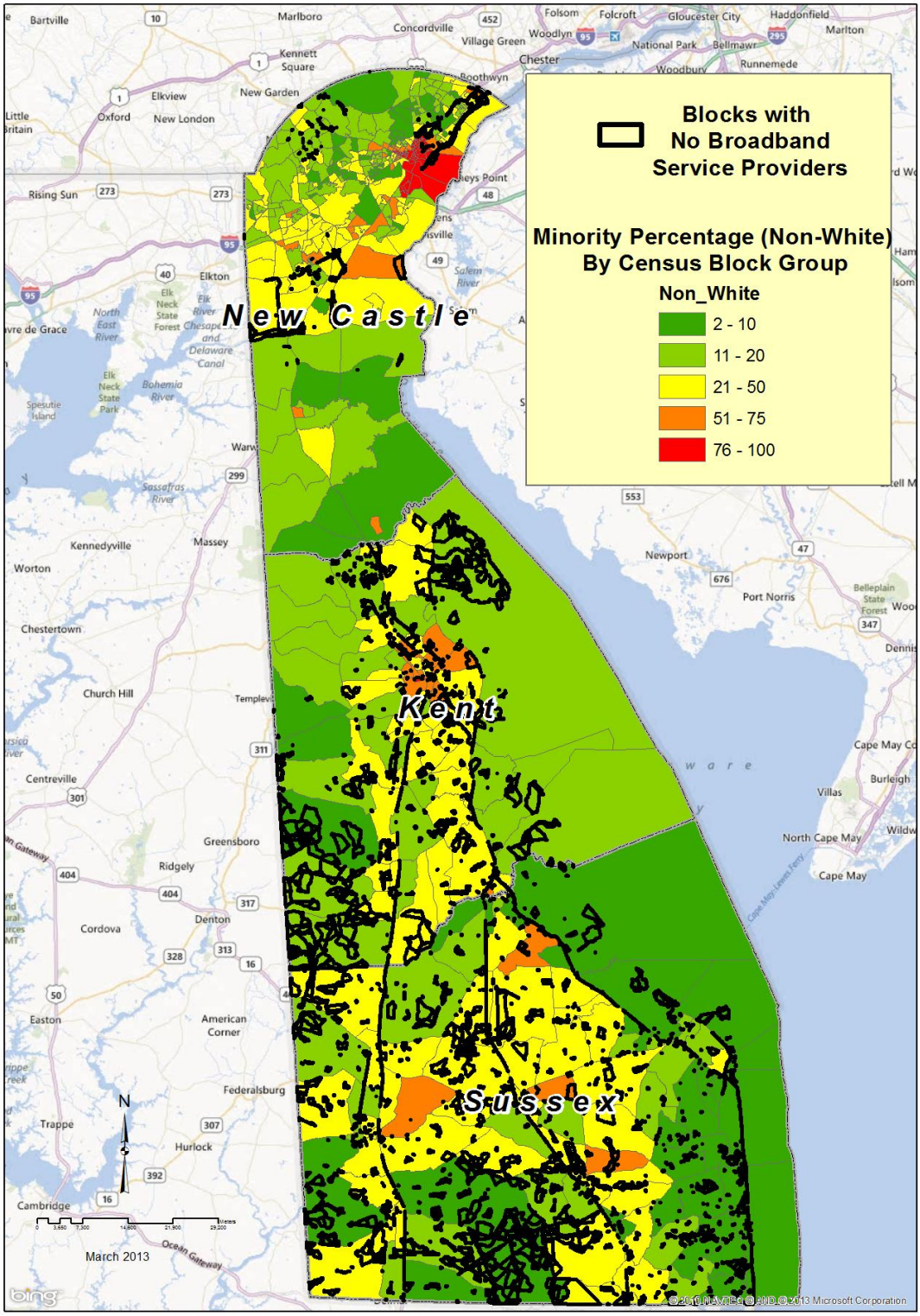

Attachment 4
Known Tower Locations
Identified Towers
Piedmont
Brandywine
Pike Creek-Central Kirkwood
Lower Christiana
Wilmington
Greater Newark
Upper Christiana
New Castle
Central Pencader
Red Lion
New Castle
Middletown-Odessa
Smyrna
Kenton
Dover
Kent
Central Kent
Milford North
Felton
Harrington
Milford South
Bridgeville-Greenwood
Milton
Lewes
Sussex
Georgetown
Seaford
Millsboro
Laurel-Delmar
Selbyville-Frankford
N
September 2011

Attachment 5

Average Age by Census Block Group

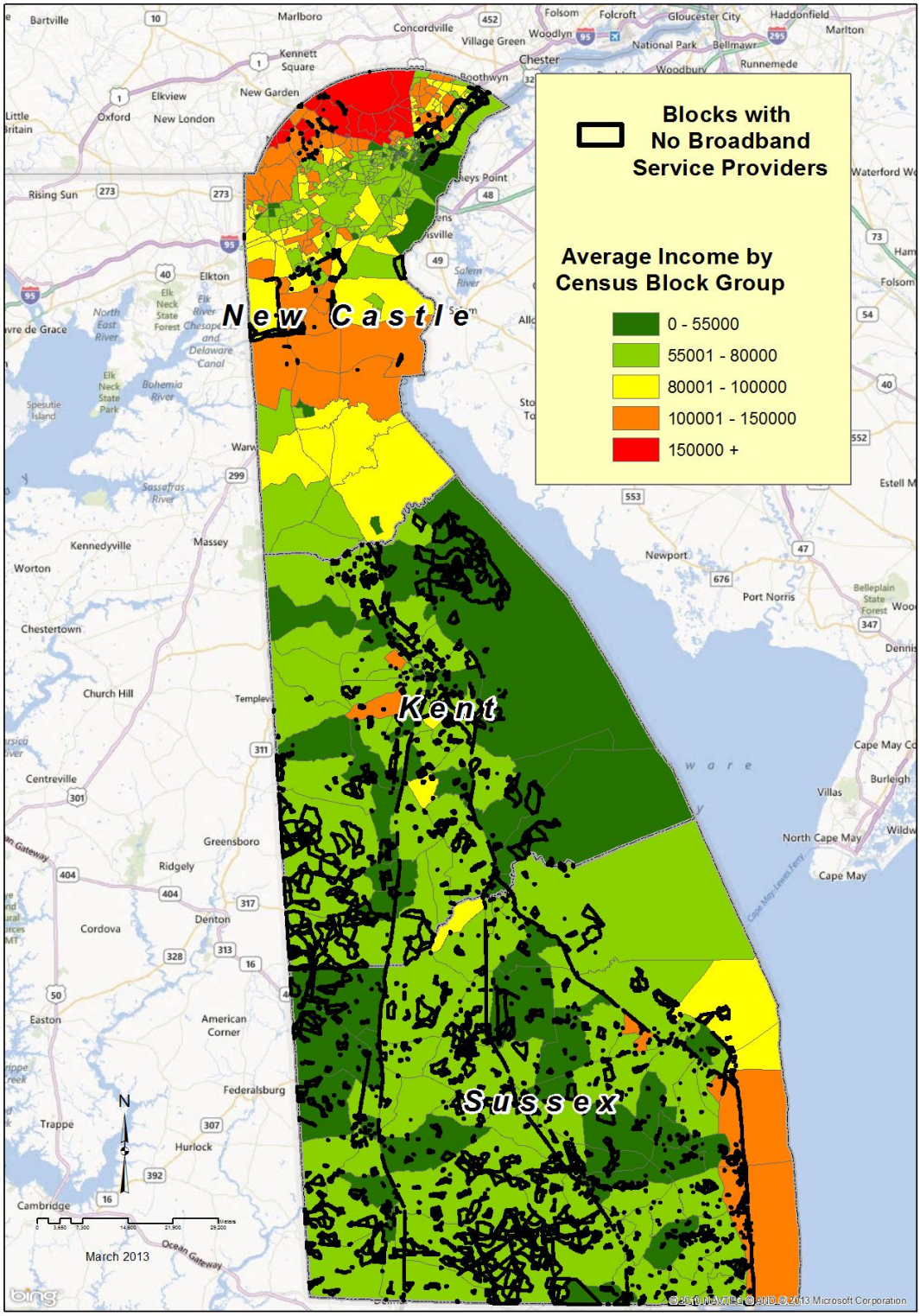


Attachment 6
Minority Percentage (Non-White) By Census Block Group



Attachment 7

Average Income By Census Block Group



OFFICIAL APRIL 2013 UPDATE SUBMISSION TO THE NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION UNDER THE STATE BROADBAND INITIATIVE PROGRAM FOR THE STATE OF FLORIDA

April 1, 2013

TABLE OF CONTENTS

BROADBAND FLORIDA COVER LETTER

April 1, 2013

Ms. Anne W. Neville
SBI Grant Program Director
National Telecommunications and Information Administration
U.S. Department of Commerce
1401 Constitution Avenue, NW Room 4716
Washington, DC 20230

Dear Ms. Neville:

The state of Florida is pleased to present this submission for Florida's State Broadband Initiative (SBI) Grant Program.

These artifacts should be found to be compliant with the April 1, 2013, deadline for the semi-annual data update and in accordance with the terms of the July 1, 2009, Notice of Funds Availability (NOFA) and all subsequent clarifications pertaining to delivery of state-level mapping of broadband service availability.

Within the timeframe of this reporting cycle the Florida Department of Management Services (the Department or DMS) is pleased to announce the promotion of Tabitha Hunter as the Director of Broadband Programs and the addition of Julie Gowen as the Broadband Mapping Project Manager. Ms. Gowen is and engineer with a background in telecommunications and is an excellent addition and asset to the team. The Department also continued the transition of services from our interim contractor and reviewed the processes from the October 2012 submission to identify ways to improve for the April 2013 submission. The Department started receiving services from BroadMap, LLC mid-October and has now fully transitioned services from the Tampa Bay Regional Planning Council who was our interim contractor. The Department experienced characteristic responsiveness and was able to successfully negotiate additional non-disclosure agreements. BroadMap and the Department worked with providers to familiarize them with the data process and the Provider Portal; an interactive tool utilized to verify and modify service coverage areas and technology information. While we did not get final data submissions from all providers in time to include with this submission, the increase in communication, the availability of the Provider Portal, the interest in the project, and willingness of the providers to submit data to the State of Florida will hopefully result in additional data for the October 2013 submission.

The April 2013 semi-annual data update under the State Broadband Initiative Grant Program continues to demonstrate our dedication to implementing the joint purposes of the Recovery Act and the Broadband Data Improvement Act (BDIA) by gathering comprehensive and accurate state-level broadband mapping data, developing state-level broadband maps, aiding in the development and maintenance of the National Broadband Map, and undertaking statewide

initiatives for broadband planning.

Broadband Service Availability – Provider Outreach and Verification

The Department made every effort to contact the providers regarding data submittals and data verification with the Provider Portal to confirm or correct the individual provider's coverage map. A complete roster by provider depicting participation status is included in the narrative. This data update submission under the SBI program includes datasets for approximately 57 percent of the Florida provider community, or 44 of 77 total providers. The Department is excited to report that five providers submitted data for the first time for this submission cycle. There are additional providers that have agreed to provide the state with data and are in the process of signing NDAs and/or collecting data. Of the 44 actively participated providers, 28 supplied an update to their network or coverage area(s) and a total of 6 providers reported there was no change in their coverage area. There are providers who previously supplied data but were non-responsive in the April 2013 update effort; therefore their previous dataset is being put forward as part of this compilation. Of all of the providers that are not represented in the attached datasets, only 3 refused to participate in the voluntary program.

Broadband Florida believes that all commercially reasonable efforts were made to account for 100 percent of the known Florida broadband provider community, pursuant to this semi-annual data update submission.

Broadband Florida continued to develop our state mapping tool, located at http://map.broadbandfla.com. It includes additional datasets not required by NTIA, a street level view widget, the ability to identify broadband coverage and providers by address, provider footprints, various speed layer views, and layer sections capability. The Department selected a vendor to develop a Broadband Florida portal that will produce a high quality product to showcase the Broadband Florida Initiatives. The new site will include pages for each of the Broadband Florida funded projects, various surveys to collect data, a way for consumers to contact members of the Broadband Florida team, opportunities for consumers to submit feedback, and useful historical and reference information.

The Department is currently concentrating on how to make the broadband data useful to Florida citizens and government agencies. It recently provided data and maps to the Department of Education and the state legislature regarding broadband service coverage and speed availability for all the public schools in Florida. The schools in Florida are undertaking an assessment of their broadband infrastructure and capacity to assist with the planning and future of digital learning. Broadband Florida contributed by identifying service coverage, verifying service coverage with USACs form 471 information, identifying infrastructure, and infrastructure needs.

Also, the Department just recently obtained data sets on broadband infrastructure including fiber optic routes, fiber lit buildings, cell tower locations, wireline and wireless coverage, submarine cables, and wire centers from GeoTel Communications, LLC. This information provided by GeoTel will provide additional third party verification capabilities. As the information was received shortly before the submittal it will be incorporated as soon as possible, but will not be included in the April submission.

Community Anchor Institutions

The Department continues to reach out to CAIs to obtain broadband connectivity data through its relationships with other state agencies. It recently worked with the Department of Education on a school survey obtaining broadband information including subscribed bandwidth and speed tests by school location for over 3,000 schools in Florida. While the data was collected, it is not included in this submission due to timing issues. The additional information will be included in our October 2013 submission. Additionally, it is working with BroadMap on obtaining data using a screen scraper utility which directly obtains information from the USAC database and will also be providing a CAI survey to collect additional information.

The Department recognizes the role that statewide associations play in promoting the importance of broadband connectivity at anchor institutions and participation in this data collection process. The Department will continue to build upon the relationships over the coming months and to utilize its contacts throughout the state to collect data and raise awareness of this project.

We appreciate the chance to participate in the SBI project and believe that the projects have and will create opportunities for citizens of Florida throughout all regions and demographic categories in the state. We plan to continue to bring best practice to our efforts, along with an investment of both human and technical resources required to reach our goal of increasing the data that is secured and reported as part of this process.

If you have any questions about this data narrative, please do not hesitate to contact me, at (850)-921-1648.

Respectfully submitted,

Tabitha Hunter
Director of Broadband Programs
Department Management Services
State of Florida

SBI Data Submission Methodology

The submission of the broadband dataset for April 1, 2013, is contained within the SBI Data Transfer Model as released on the Grantee Workspace on December 14, 2012. Broadband Florida reviewed all literature that relates to the release and use of this data transfer model and recognizes that it does not replace or dictate how data is stored, processed, or displayed for the state, as it is meant primarily as a means to transfer the broadband data from all states and territories and populate the National Broadband Map in a seamless fashion. Guidance from the Technical Mapping Guide, as released on the Grantee Workspace, as well as the submission webinar, was also followed to ensure the completeness and validity of the submission.

As the NTIA requested a provider worksheet page to reflect only the providers included in the geodatabase submission, a table that summarizes the status of all providers can be found at the end of the narrative. Providers deemed non-viable that were excluded from continued outreach may have been eliminated for reasons such as (i) the company offers Internet service but at speeds below the current definition of broadband; (ii) the company was listed in advertisements as a broadband provider, but is actually a network solution or consulting firm, etc.; (iii) the company may build or install network infrastructure, but does not actually provide the broadband service to consumers; and (iv) the company has gone out of business.

In addition to the methodologies contained herein, as well as the DataPackage.xls containing contact information, the data dictionary, and a provider summary table, the following feature classes are submitted within the SBI Data Transfer Model for the state of Florida.

Inventory of Deliverables, Broadband Florida: April 1, 2013

NOFA Requirement	Data Transfer Model	Data Description
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband service availability of facilities-based providers. Encompassed in Census Blocks of no greater than two square miles in area.
Appendix A: 1(a)(ii)	BB_Service_RoadSegment	Broadband service availability of facilities-based providers by road segment in Census Blocks larger in area than two square miles.
Appendix A: 1(b)	BB_Service_Wireless	Broadband service availability of wireless services not provided to a specific address.
Appendix A: 3(b)	BB_ConnectionPoint_MiddleMile	Broadband service infrastructure Middle-Mile locations
Appendix A: 4	BB_Service_CAInstitutions	Community anchor institution locations

The provider data collected by Broadband Florida was formatted per the given specifications and uploaded into the appropriate feature classes of the SBI Data Transfer Model. Wireline availability is contained within census blocks and road segments, wireless availability is contained as polygons of coverage areas, and middle-mile connections and Community Anchor Institutions are contained as point data. All speed data is contained at the census block, road segment, address point, or wireless polygon level of availability. All efforts were made to

comply with formatting, domain, and metadata requirements to include as much information as possible.

Broadband Florida, through its contractors, continued reach out to satellite providers on their availability, technology, and speed information, but focused sub-state coverage is not yet available. Included within the wireless feature class are the satellite companies providing service to Florida as a polygon of the state boundary.

DATA GATHERING

Provider Service Areas and Middle Mile Aggregation Points

Broadband Florida (the Department or DMS and BroadMap) made every effort to contact the providers regarding data submittals and data verification and followed the data gather process described below:

- Built and maintained an inventory of Broadband providers through currently known providers and research.
- Inventory and everyday interaction with providers was tracked using the Provider Catalog (PCat).
- Updated provider material that describes the data requirements and logistics for data transfer.
- Updated Non-Disclosure Agreements (NDA) for use in the project, where applicable.
- Maintained multiple protocols for the provider to submit data, including Secure File Transfer Protocol (SFTP) technology when desired.
- Conducted one-on-one informational discussions with each provider to communicate the following:
    - Requirements of this project.
    - Broadband data required to support the product data model.
    - Submission protocols available.
    - Capability to validate how the supplied data is aggregated.
- Downloaded/received provider data.
- Established a repeatable process with the provider. Maintained provider communication, transaction, and data handling records throughout the project (dates contacted, data received, etc.).

Community Anchor Institution (CAI)

The Department and BroadMap put forth considerable efforts within this reporting period to, not only identify additional broadband connectivity information, but also to ensure quality of the existing dataset. The CAI data was once again audited by our contractor and modified to increase accuracy. Additionally, the Department obtained all new data, which consisted of over 8,400 locations, for Healthcare entities.

The CAI featureclass was enhanced to provide more broadband information percentage overall. Broadband Florida ensured that all CAI data collected could be mapped back to the original sources through the use of unique identifiers that exist in public datasets to ensure that the data

could be updated on a regular basis. The confidence level of site placement is greater as well for sites that still have unknown broadband status. Geocoding was run through multiple address locators for higher match scores.

The Department was able to obtain broadband speed survey results from the Department of Education for the 3500 plus schools in Florida. The survey also included five speed test results conducted in each building at different times of the day. Due to the volume of information and the timing of the data submission this information was not included in the current submission. The Department is looking forward to submitting that data in the October 2013 submission.

The Department's mission is to continue to seek out CAI data resources and to promote the importance of the project to CAIs within the state. Participation by these institutions will raise awareness about the importance of broadband connectivity and the need to report the requested data for inclusion on the National Broadband Map. The Department of Management Services will continue working to identify new outreach methods that will be beneficial to the project.

A CAI summary of all processed and submitted data is provided below:

CAI Type	Total	Physical Address	Federal CAI ID	Lat/Long	Technology of Transmission	Download Speed	Upload Speed
K-12	6471	6471	1183	6471	489	676	0
Libraries	1063	1063	534	1063	518	513	5
Healthcare	8494	8494	224	8494	127	127	126
Public Safety	2839	2839	135	2839	350	350	0
Higher Ed Institutions	612	612	162	612	81	81	0
Other Government	4225	4225	0	4225	3408	3430	0
Other Non-Government	280	280	0	280	279	280	0
Total	**23,984**	**23,984**	**2,238**	**23,984**	**5,252**	**5,457**	**131**

The collection of CAI information is handled through the following CAI Collection Process:

- Collect and maintain inventory of CAIs through currently known CAIs, data mining, and research.
- Maintain web-based CAI portal for institutions to add or confirm attribution, location and enter broadband-specific information.
- Upload web-based data to Core Database for standardization.
- Perform internal cleansing, such as removing duplicate records, identifying gaps in broadband attribution and verifying category.
- Geocode CAI locations.
- Translate Core Database data to deliverable-ready format.
- Continue engagement with non-responsive institutions.

DATA INTEGRATION PROCESS

The data integration and processing mechanisms currently used allows for multiple types of inputs and result in a standardized output that meets the NTIA deliverable requirements. This flexible process supports data model changes and project-requested enhancements as specified below:

- Receive inputs from providers via submission protocols; upload into a sourcing database and catalog with provider information.
- Review provider-supplied data for completeness and for potential discrepancies that require resolution prior to processing and flag as necessary.
- Categorize input into data-type category (addresses, block lists, paper maps, etc.).
- Standardize input based on data type within staging database.
- Create Compact Polygons (CP)—(internal methodology for generating area-based feature for coverage in staging database).
- Apply broadband attribution to CP; apply metadata to CP.
- Perform quality analysis of the CP against the source supplied to identify any completeness or accuracy issues.
- Request additional information from the provider if elements of coverage are missing or contain discrepancies. This is a second manual quality check to ensure data is complete.
- Process coverage area to build the required NTIA data model layers.

With the deployment of the Provider Portal this round, the data collection and later validation process was streamlined allowing both activities to occur within a secure web application. The majority of the providers will use this methodology as it supplies them with more visibility into how their data is being represented and gives them knowledge and ownership of their coverage representation. The Provider Portal provides benefits to the data integration process and to the providers as shown:

- Each provider is assigned credentials with a strong password to ensure security measures are taken into consideration.
- Collection and confirmation our contact, as well as the company's DBA Name and FRN accuracy.
- Capability to review and request changes to the coverage footprint.
- The provider can Add/Remove portions, or all, of the footprint requesting that their footprint be increased or refined.
- Middle Mile and Average Weight Nominal Speed (AWNS) collection and validation.
- File upload functionality to support providers that would prefer a shapefile, spreadsheet, PDF, KMZ/KML file be used to reflect changes for the data round.
- Once the provider has review completed changes to their coverage, middle mile and AWNS, then can validate them all signing off that everything is accurate.

DATA VALIDATION AND VERIFICATION

Broadband providers maintain their service area data in many different formats, all in varying levels of complexity and resolution. The NTIA has assigned various levels of classification for the bandwidth speed and transmission technology. These classifications are not a perfect fit for

all providers, but the data they submit in a variety of formats has to be molded into a common framework, and this framework is the geodatabase with stacked layers. Having these stacked layers in a mappable geodatabase does not necessarily mean they are correct. A number of checks and balances must be performed to ensure a reasonable snapshot of the last six months of broadband availability in the state of Florida. These methods include (but are not limited to): provider validation, topological validation, third party data verification, public verification, speed test metrics, and confidence values which occur during the data validation and verification process.

Broadband Provider Validation – Provider Portal Application

Providers are trained on and requested to use a secure interactive web application to review their current coverage area(s) and supporting broadband attribution to validate their data or submit change requests to update their data. All provider change requests go through the data integration process and are reviewed with the provider to complete validation.

If further detail and focus is required based on the initial feedback from the provider, Broadband Florida devotes attention to the provider and verification correction begins. The resulting map(s) and review process allow for providers to see their service area in a geographic format. For some providers, this is the first time they have seen maps of their broadband service area. Having the mapped service area allows providers to quickly identify any issues that appear in the data representation, whether the issue is in the data translation into a GIS format or from the original data collection and submission.

Often data is provided from various sources and through the review and revision process, local engineers who operate the networks and work in the field are able to ensure that the tabular data that has been submitted is accurate and represents the real-world network extent. Any issues in how the service area is represented on the map(s) are remedied by Broadband Florida, whether they are additions, removal of service, or any other revisions. With the latest released of the Provider Portal, validation on the coverage area, middle mile and average could be completed individually by selecting one record/footprint at a time or by selecting footprints and selecting the 'Valid' button within the Provider Portal. After approval by the provider, the spatial depiction of the data is considered a success. All validation results are tracked internally through BroadMap's validation table.

These same layers that are deemed suitable for public viewing by the NOFA are incorporated into the web map service application on the Broadband Florida map site. Public display of the layers on the Florida map site and BroadbandMap.gov site allow the general public a chance to provide feedback if in fact service is not available where it might say it is on the maps.

Topological Validation

GIS data, when imported and created from a variety of sources can look pretty or it can look ugly. We try to prevent the data from looking ugly early in the process by running the resulting data from providers through a number of filters for lack of another term. The first filter is 'eyeballing' the data for inconsistencies and strange outliers. Much of the work involved with this SBI project involves geocoding. Geocoding results can literally be all over the map. The eyeballing of the geocoding results can pick up misses of machine coding return scores that

would otherwise be considered valid. If left to using the address ranges on their own, street segment creation from address ranges can produce a messy unrealistic patchwork of availability. Another filter is transferring the data to topologically correct features. This 'conflation' process can filter out strange anomalies produced from using TIGER line files as the base for road segments. Many providers dump the TIGER line data of more than just the roads, such as water bodies and political lines. Conflation solves the strange outlier availability by transferring the data over to road segments that are spatially accurate. The result is road segments that spatially depict where broadband infrastructure would most likely be deployed. In some cases, however, even though data is transferred over to correct roads, source data reveals only a certain segment of addresses. No matter how bad it may look, over-correcting is changing the data, so only when there is logical evidence that a road segment should be extended considerably, or cut down, will we correct the data in this manner.

The data inside the table itself may have been exported or imported with errors. Many times, data had been imported only to be unusable or considerable work has to get it corrected after it is inside a featureclass or shapefile. It is always best to correct the data before import or loading. This type of validation can catch improper field character imports like lat/lon values that get truncated or rounded. The same can happen of Census Block FIPS code transfers that are not properly formatted as text. ArcGIS has tendency to round those into scientific notation.

Third-Party Data Verification

For this submission, third party data was reviewed to ensure any corrections required were represented in the final product and the supporting documentation to the NTIA. This includes: third party data; additional feedback received directly from NTIA prior to this data submission; and the comparison to the previous data submission as a quality check to identify and resolve any potential erroneous discrepancies between the two products.

The Department also verified data by identifying service coverage available for all schools and then cross referenced the service coverage with USACs form 471 information. We were able to identify schools that appeared to have no existing coverage that were requesting funding for Internet access. From that information we were able to identify the providers and have requested that they modify their coverage areas to reflect availability at these locations.

Public Verification

The broadband interactive map has been released to the public, which includes functionality to collect feedback on the provider's coverage areas, as well as running a speed test. The feedback and speed results are collected and reviewed with the providers prior to the next data submissions to identify if any map refinement is required.

Speed Test Verification

Broadband Florida has continued its subscription with Ookla for website portal speed test application to gather speed test statistics from around the state. Ookla owns and operates Speedtest.net, as well as develops and deploys speed tests for partners around the world. This network of sites that is developed and run on its testing technology provides Ookla with a vast

dataset that, due to the variability of geographic information collected across the varying speed test sites, is geocoded utilizing Geo-IP technology. This technology allows for tests to be geocoded to points of aggregation, typically larger nodes across provider networks. While there are hundreds of thousands of tests that have been conducted, the level of aggregation is only sufficient for county-level detail due to the test results being located at these larger nodes and not at an absolute location for each speed test.

Confidence Values

All verification, validation and manual quality review results are tracked by provider/technology type and stored and maintained within a validation table. A confidence value is assigned, based on internal assessments of the collected information, to highlight the provider coverage areas and/or attributions that would benefit from further investigation and/or enhancements.

With the continued efforts on provider validation, third party verification and the release of the public interactive map with feedback collection functionality, the confidence values will continue to be utilized further to identify specific areas in need of attention.

QUALITY CONTROL

The product is checked manually and algorithmically against the NTIA data model after collection, processing, and analysis of the provider and CAI data. Some of the items included within these checks are: format correctness; table and field structure; valid values, including default values, where applicable; and geographic extent and topology errors.

Prior to data submission, another quality control script supplied by NTIA is run. This script, SBDD_CheckSubmission.py, creates an output in text form that is required to be submitted along with the final deliverable. All errors must come up clean, unless otherwise specified by NTIA.

BROADBAND Florida

Broadband Provider Status Log

No.	Filing Company DBA	Provider Type: Broadband=1, Reseller=2, Other=3, N/A=4	FRN	Viable Provider	Data Included in Submission	Responsive				Non-Responsive	
						Refused to Participate	Submitted Updated Data	No Change in Data	Missed Deadline; No Data Included in Submission	Data from previous submission included	No Data Included
1	21Globe, Inc.	2	9999	·	·	·	·	·	·	·	·
2	3oaks.com	4	9999	·	·	·	·	·	·	·	·
3	561net	4	9999	✓	·	·	·	·	·	·	✓
4	650Net	4	9999	·	·	·	·	·	·	·	·
5	A 007 Access	2	9999	·	·	·	·	·	·	·	·
6	AAA Internet Service	4	9999	·	·	·	·	·	·	·	·
7	Aaccess Network Communications	4	9999	·	·	·	·	·	·	·	·
8	Access123.net	4	9999	·	·	·	·	·	·	·	·
9	ACERX.NET	2	9999	·	·	·	·	·	·	·	·
10	ACES of Jacksonville, Inc.	4	9999	·	·	·	·	·	·	·	·
11	Adelphia	4	9999	·	·	·	·	·	·	·	·
12	Advanced Cable Communications	1	1795798	✓	✓	·	·	·	·	✓	·
13	Advantage Group of Florida Communications, LLC	2	18515692	·	·	·	·	·	·	·	·
14	AirCom Broadband, Inc.	2	9999	·	·	·	·	·	·	·	·
15	AirComm Associates	4	9999	·	·	·	·	·	·	·	·
16	Airespring, Inc.	2	6875322	·	·	·	·	·	·	·	·
17	Airewaves Broadband, LLC	4	9999	·	·	·	·	·	·	·	·
18	Airface	4	9999	·	·	·	·	·	·	·	·
19	Airimba Wireless	4	9999	·	·	·	·	·	·	·	·
20	AirLink Corporation	4	9999	·	·	·	·	·	·	·	·
21	Airmail247.com	4	9999	·	·	·	·	·	·	·	·
22	Airpath Wireless, Inc.	4	9999	·	·	·	·	·	·	·	·
23	airPowered	1	16106239	✓	✓	·	·	·	·	✓	·
24	AirWire Net	2	9999	·	·	·	·	·	·	·	·
25	Akeva	4	9999	·	·	·	·	·	·	·	·

BROADBAND Florida

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						Refused to Participate	Submitted Updated Data	No Change in Data	Missed Deadline; No Data Included in Submission	Data from previous submission included	No Data Included
26	AKODI	4	9999	·	·	·	·	·	·	·	·
27	Altitude	1	9999	✓	·	·	·	·	·	·	✓
28	America Outdoors Camper Resort and Marina	4	9999	·	·	·	·	·	·	·	·
29	American Telephone Company LLC	2	15414642	·	·	·	·	·	·	·	·
30	Antioch Wireless Broadband	4	9999	·	·	·	·	·	·	·	·
31	Anywhere Internet, Inc.	4	9999	·	·	·	·	·	·	·	·
32	AreYouOnline.Net	1	9999	✓	✓	·	✓	·	·	·	·
33	Arrowheadnet.com	4	9999	·	·	·	·	·	·	·	·
34	AstroTel, Inc.	2	8779878	·	·	·	·	·	·	·	·
35	AT&T Florida	1	1857952	✓	✓	·	✓	·	·	·	·
36	AT&T Mobility LLC	1	4979233	✓	✓	·	✓	·	·	·	·
37	Atlantic Broadband, LLC	2	9596826	✓	✓	·	✓	·	·	·	·
38	AugLink Communications, Inc.	4	9999	·	·	·	·	·	·	·	·
39	bargainisp.net	4	9999	·	·	·	·	·	·	·	·
40	Birch Communications, Inc.	1	4319299	✓	·	✓	·	·	·	·	·
41	Bluemont Networks, LLC	4	16802266	·	·	·	·	·	·	·	·
42	Break Free Wireless Corporation	4	9999	·	·	·	·	·	·	·	·
43	Bright House Networks	1	7508237	✓	✓	·	·	·	·	✓	·
44	Broadband National	2	9999	·	·	·	·	·	·	·	·
45	Broadcore, Inc.	4	18122523	·	·	·	·	·	·	·	·
46	Broadstar, LLC	4	16981573	·	·	·	·	·	·	·	·
47	Broadview Networks Holdings, Inc.	2	10296853	·	·	·	·	·	·	·	·
48	BullsEye Telecom, Inc.	2	4350930	·	·	·	·	·	·	·	·
49	Business Telecom, Inc.	4	3744935	·	·	·	·	·	·	·	·
50	Cablevision of Marion County LLC	1	11406675	✓	·	·	·	·	·	·	✓

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						Refused to Participate	Submitted Updated Data	No Change in Data	Missed Deadline; No Data Included in Submission	Data from previous submission included	No Data Included
51	CAC MediaNet, Inc.	4	9999	·	·	·	·	·	·	·	·
52	Camino-Net Internet Services	4	9999	·	·	·	·	·	·	·	·
53	Caviair Corporation	4	9999	·	·	·	·	·	·	·	·
54	Cbeyond Communications, LLC	2	3759602	·	·	·	·	·	·	·	·
55	CCIS.net	4	9999	·	·	·	·	·	·	·	·
56	Celito Communications	4	9999	·	·	·	·	·	·	·	·
57	Cellular South, Inc.	1	13247325	✓	✓	·	·	·	·	✓	·
58	CenturyLink	1	18626853	✓	✓	·	✓	·	·	·	·
59	CIMA Telecom	2	8570111	·	·	·	·	·	·	·	·
60	Circle Net	4	9999	·	·	·	·	·	·	·	·
61	Citi WiFi Networks	4	9999	·	·	·	·	·	·	·	·
62	Citicom Comm Serv	4	9999	·	·	·	·	·	·	·	·
63	Citrus Hills Cable TV, Inc.	4	9999	·	·	·	·	·	·	·	·
64	City of Leesburg	1	10556496	✓	✓	·	✓	·	·	·	·
65	Citynet, LLC	4	14281588	·	·	·	·	·	·	·	·
66	Clear	1	17775628	✓	✓	·	✓	·	·	·	·
67	ClearSurf Communications, Corp	4	9999	·	·	·	·	·	·	·	·
68	Cleartouch.Com	4	9999	·	·	·	·	·	·	·	·
69	Cogent Communications, Inc.	2	19066034	✓	·	·	·	·	·	·	✓
70	Comcast	1	4441663	✓	✓	·	✓	·	·	·	·
71	CommFunction, LLC	1	9999	✓	·	·	·	·	·	·	✓
72	Computer Cable Connection	4	9999	·	·	·	·	·	·	·	·
73	Cox Communications	1	1524461	✓	✓	·	✓	·	·	·	·
74	Creative Network Innovations	4	9999	·	·	·	·	·	·	·	·
75	CyberStreet Inc.	1	9999	✓	·	✓	·	·	·	·	·
76	CyberXpress, Inc.	4	9999	·	·	·	·	·	·	·	·
77	Data Wave, Inc.	4	9999	·	·	·	·	·	·	·	·

BROADBAND Florida

Broadband Provider Status Log

No.	Filing Company DBA	Provider Type: Broadband=1, Reseller=2, Other=3, N/A=4	FRN	Viable Provider	Data Included in Submission	Responsive				Non-Responsive	
						Refused to Participate	Submitted Updated Data	No Change in Data	Missed Deadline; No Data Included in Submission	Data from previous submission included	No Data Included
78	DayStar Communications	4	9999	·	·	·	·	·	·	·	·
79	DeltaCom	1	5183025	✓	✓	·	✓	·	·	·	·
80	Deltaforce	4	9999	·	·	·	·	·	·	·	·
81	deluxehost.com	4	9999	·	·	·	·	·	·	·	·
82	Desoto Life	4	9999	·	·	·	·	·	·	·	·
83	DGUI	4	9999	·	·	·	·	·	·	·	·
84	DHR Technologies, Inc.	4	9999	·	·	·	·	·	·	·	·
85	Dial National	4	9999	·	·	·	·	·	·	·	·
86	Dialer.net	4	9999	·	·	·	·	·	·	·	·
87	Digital Canopy	4	9999	·	·	·	·	·	·	·	·
88	Digital Downtown	4	9999	·	·	·	·	·	·	·	·
89	DISH Network Corporation	2	10500338	✓	·	·	·	·	·	·	✓
90	Dixie-Net, Incorporated	4	9999	·	·	·	·	·	·	·	·
91	DSL @ Interlync	2	9999	·	·	·	·	·	·	·	·
92	DTNet	4	9999	·	·	·	·	·	·	·	·
93	DTS-NET.COM	2	9999	·	·	·	·	·	·	·	·
94	Dynalink Communications	2	9999	·	·	·	·	·	·	·	·
95	eHarbor	4	9999	·	·	·	·	·	·	·	·
96	Enventis Telecom Inc.	4	8394322	·	·	·	·	·	·	·	·
97	ethX.biz	4	9999	·	·	·	·	·	·	·	·
98	ETI - Connecting Your World	2	9999	·	·	·	·	·	·	·	·
99	eTully, Inc.	4	9999	·	·	·	·	·	·	·	·
100	EWOL	4	9999	·	·	·	·	·	·	·	·
101	Expedient	4	9999	·	·	·	·	·	·	·	·
102	FairPoint Communications, Inc.	1	1824606	✓	✓	·	✓	·	·	·	·
103	Fast Dependable Access	4	9999	·	·	·	·	·	·	·	·
104	FiberLight LLC	1	14117139	✓	·	·	·	·	·	·	✓

BROADBAND Florida

Broadband Provider Status Log

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105	FiberTower Corporation	4	4237178	·	·	·	·	·	·	·	·
106	FLAccess, Inc.	4	9999	·	·	·	·	·	·	·	·
107	Florida Broadband	4	9999	·	·	·	·	·	·	·	·
108	Florida Cable, Inc.	1	7170558	✓	·	·	·	·	·	·	✓
109	Florida Georgia Online	4	9999	·	·	·	·	·	·	·	·
110	Florida High Speed Internet aka Brevard Wireless	1	16346991	✓	·	·	·	·	·	·	✓
111	Florida Keys Wireless	4	9999	·	·	·	·	·	·	·	·
112	Florida LambdaRail, LLC*	1	9999	✓	·	·	·	·	✓	·	·
113	Florida Multi-Media Services, Inc.	2	18567123	·	·	·	·	·	·	·	·
114	Florida Phone Systems, Inc.	4	18624494	·	·	·	·	·	·	·	·
115	Florida Rural Broadband Alliance	4	9999	·	·	·	·	·	·	·	·
116	Florida Wireless	4	9999	·	·	·	·	·	·	·	·
117	FlyFi	4	9999	·	·	·	·	·	·	·	·
118	FPL FiberNet, LLC	1	8338683	✓	·	·	·	·	·	·	✓
119	FPUAnet Communications	1	1813369	✓	·	·	·	·	·	·	✓
120	Frontier Communications of the South, LLC	1	3766987	✓	✓	·	✓	·	·	·	·
121	Fullsail Group	4	9999	·	·	·	·	·	·	·	·
122	Fuzion Wireless	4	9999	·	·	·	·	·	·	·	·
123	GBS Online	1	9999	✓	·	·	·	·	·	·	✓
124	General Computer Services Inc.	4	18596882	·	·	·	·	·	·	·	·
125	Global Data Systems	4	9999	·	·	·	·	·	·	·	·
126	Global WiFi Plus	4	9999	·	·	·	·	·	·	·	·
127	GLS3C Systems	4	9999	·	·	·	·	·	·	·	·
128	GRUCom*	1	18584425	✓	·	·	·	·	·	·	✓
129	Gulf Coast Internet Company	4	9999	·	·	·	·	·	·	·	·
130	Hi Development	4	9999	·	·	·	·	·	·	·	·

BROADBAND Florida

Broadband Provider Status Log

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131	Home Town Plus	1	9470766	✓	✓	·	·	✓	·	·	·
132	Hotwire Communications, Ltd.	4	9846494	·	·	·	·	·	·	·	·
133	Hubwest Protected Networks LLC	4	9999	·	·	·	·	·	·	·	·
134	Hughes Network Systems, LLC	1	17434911	✓	✓	·	✓	·	·	·	·
135	Imbris, Inc.	4	9999	·	·	·	·	·	·	·	·
136	IMGISP.NET	4	9999	·	·	·	·	·	·	·	·
137	Immedia Sea	4	9999	·	·	·	·	·	·	·	·
138	Incredible Networks	4	9999	·	·	·	·	·	·	·	·
139	Inercom Communications Inc.	4	9999	·	·	·	·	·	·	·	·
140	Interactive Services Network, Inc.	2	4328456	·	·	·	·	·	·	·	·
141	Interactiveinfo.com Inc.	4	9999	·	·	·	·	·	·	·	·
142	Interatworld	4	9999	·	·	·	·	·	·	·	·
143	IntNet	2	9999	·	·	·	·	·	·	·	·
144	IPacket Networks, LLC	4	16724494	·	·	·	·	·	·	·	·
145	iRadical	4	9999	·	·	·	·	·	·	·	·
146	ISPartner.net	4	9999	·	·	·	·	·	·	·	·
147	ITS Telecom	1	3731734	✓	✓	·	·	✓	·	·	·
148	James Cable LLC	1	16914137	·	·	·	·	·	·	·	·
149	JaxWIZ	4	9999	·	·	·	·	·	·	·	·
150	Jenco Speed Web	4	9999	·	·	·	·	·	·	·	·
151	Joytel Communications	4	9999	·	·	·	·	·	·	·	·
152	JTEL Communications	4	9999	·	·	·	·	·	·	·	·
153	K.Tek	4	9999	·	·	·	·	·	·	·	·
154	KCL	2	9999	·	·	·	·	·	·	·	·
155	Kentucky Data Link, Inc.	4	7345754	·	·	·	·	·	·	·	·
156	Kissimmee Utilities Authority	4	9999	·	·	·	·	·	·	·	·
157	Knology of Florida, Inc.	1	3766268	✓	✓	·	·	·	·	✓	·

BROADBAND Florida

Broadband Provider Status Log

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158	Knology of Panama, Inc.	1	1808666	✓	✓	·	✓	·	·	·	·
159	LARIAT.NET	4	9999	·	·	·	·	·	·	·	·
160	LCN	4	9999	·	·	·	·	·	·	·	·
161	LCSisp.com	4	9999	·	·	·	·	·	·	·	·
162	Leap Wireless International, Inc.	4	9999	·	·	·	·	·	·	·	·
163	Level 3 Communications, LLC	1	3723822	✓	✓	·	✓	·		·	·
164	LightEdge Solutions, Inc.	4	15546443	·	·	·	·	·	·	·	·
165	Lightning Wireless	4	9999	·	·	·	·	·	·	·	·
166	Lightyear Network Solutions, LLC	2	9999	·	·	·	·	·	·	·	·
167	LinkAmerica.Net	4	9999	·	·	·	·	·	·	·	·
168	Litestream Holdings, LLC	1	999	✓	·	·	·	·	·	·	✓
169	Litestream Technologies	1	1149800086	✓	·	·	·	·	·	·	✓
170	Long Hammock Wireless	1	9999	✓	✓	·	·	·	·	✓	·
171	Magnolia Belle Data Systems, Inc.	4	9999	·	·	·	·	·	·	·	·
172	Main Street Broadband LLC	1	14962880	·	·	·	·	·	·	·	·
173	MainBoard	4	9999	·	·	·	·	·	·	·	·
174	Maine Cable and Wireless	4	9999	·	·	·	·	·	·	·	·
175	Marcin Company	4	9999	·	·	·	·	·	·	·	·
176	Marco Island Cable, Inc.	1	4243689	✓	·	·	·	·	·	·	✓
177	Marlowe & Associates	2	9999	·	·	·	·	·	·	·	·
178	Mediacom	1	4036778	✓	✓	·	✓	·	·	·	·
179	Megapath Corporation	1	3753787	✓	✓	·	✓	·	·	·	·
180	Metropolitan Telecommunications Holding Company	2	9806019	·	·	·	·	·	·	·	·
181	MFI.net	2	9999	·	·	·	·	·	·	·	·
182	Millenicom Inc.	2	9999	·	·	·	·	·	·	·	·
183	Mobile Area Networks, Inc.	4	9999	·	·	·	·	·	·	·	·

BROADBAND Florida

Broadband Provider Status Log

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						Refused to Participate	Submitted Updated Data	No Change in Data	Missed Deadline; No Data Included in Submission	Data from previous submission included	No Data Included
184	Myakka Technologies, Inc.	1	16084857	✓	✓	·	✓	·	·	·	·
185	Nanomega.Com	4	9999	·	·	·	·	·	·	·	·
186	National Access Point	4	9999	·	·	·	·	·	·	·	·
187	Nationwide Computer Systems, Inc.	4	9999	·	·	·	·	·	·	·	·
188	Nature Coast Networks	1	9999	✓	·	·	·	·	·	·	✓
189	NEbuTel	4	16467649	·	·	·	·	·	·	·	·
190	NEFCOM	1	4928750	✓	✓	·	·	✓	·	·	·
191	Neighbor Networks, LLC	4	6221287	·	·	·	·	·	·	·	·
192	Neopolitan Networks	4	9999	·	·	·	·	·	·	·	·
193	Net Bypass Wireless	4	9999	·	·	·	·	·	·	·	·
194	NetAccess, Inc.	4	9999	·	·	·	·	·	·	·	·
195	NetComm Internet Technologies	4	9999	·	·	·	·	·	·	·	·
196	NetCon.com	4	9999	·	·	·	·	·	·	·	·
197	Netlogic, Inc.	4	6825954	·	·	·	·	·	·	·	·
198	NetQuincy	1	4572533	✓	✓	·	·	·	✓	·	·
199	NetSpeed Online	4	9999	·	·	·	·	·	·	·	·
200	New Edge Network, Inc.	2	3720471	·	·	·	·	·	·	·	·
201	Next Level Wireless	4	9999	·	·	·	·	·	·	·	·
202	Nextlink Wireless, Inc.	4	14286934	✓	·	·	·	·	·	·	✓
203	North Florida Broadband Authority	4	9999	·	·	·	·	·	·	·	·
204	Northwest ISP	4	9999	·	·	·	·	·	·	·	·
205	NuVox, Inc.	4	4319414	·	·	·	·	·	·	·	·
206	NXCONN Wireless	4	9999	·	·	·	·	·	·	·	·
207	Oak Run Associates Ltd.	2	3745767	·	·	·	·	·	·	·	·
208	Ofinet	4	9999	·	·	·	·	·	·	·	·
209	Oltronics Wireless	4	9999	·	·	·	·	·	·	·	·
210	Omnispring LLC	1	9999	✓	·	✓	·	·	·	·	·

BROADBAND Florida

Broadband Provider Status Log

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211	Open Range, Inc.	4	15246895	·	·	·	·	·	·	·	·
212	Orlando Web Solutions	4	9999	·	·	·	·	·	·	·	·
213	Overarch Broadband	4	9999	·	·	·	·	·	·	·	·
214	Pacific Internet Exchange	4	9999	·	·	·	·	·	·	·	·
215	Paknet Limited	4	9999	·	·	·	·	·	·	·	·
216	Palm Coast-Flagler Internet, LLC	4	9999	·	·	·	·	·	·	·	·
217	PDMNet	1	17149014	✓	✓	·	·	·	·	✓	·
218	Planet Online	4	9999	·	·	·	·	·	·	·	·
219	PNA Networks	4	9999	·	·	·	·	·	·	·	·
220	Power One	2	16106239	✓	·	·	·	·	·	·	✓
221	PremoWeb	4	9999	·	·	·	·	·	·	·	·
222	PrimeVision	4	9999	·	·	·	·	·	·	·	·
223	Pure Connection	4	9999	·	·	·	·	·	·	·	·
224	Qmega Technologies	4	9999	·	·	·	·	·	·	·	·
225	Qwest Communications Company, LLC	4	3605953	·	·	·	·	·	·	·	·
226	Rapid Systems Corporation	1	14499438	✓	·	·	·	·	·	·	✓
227	Regional Internet Media	4	9999	·	·	·	·	·	·	·	·
228	Reliance Globalcom Services, Inc.	2	8072803	·	·	·	·	·	·	·	·
229	Renaissance Networks	4	9999	·	·	·	·	·	·	·	·
230	RJS Networks	4	9999	·	·	·	·	·	·	·	·
231	Sago Networks, Inc.	1	18151878	✓	✓	·	·	·	·	✓	·
232	Sands River Wireless	4	9999	·	·	·	·	·	·	·	·
233	Saturn Telecommunication Services Inc.	4	4343828	·	·	·	·	·	·	·	·
234	SBB Communications, LLC	4	19088624	·	·	·	·	·	·	·	·
235	SETEL	4	9999	·	·	·	·	·	·	·	·
236	Shentel Converged Services, Inc.	2	13962170	·	·	·	·	·	·	·	·

BROADBAND Florida

Broadband Provider Status Log

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237	Simply Dialup A Metrogeek Company	4	9999	·	·	·	·	·	·	·	·
238	Skycaster	1	9999	✓	·	·	·	·	·	·	✓
239	Skyhive	4	9999	·	·	·	·	·	·	·	·
240	Skyline Broadband	4	9999	·	·	·	·	·	·	·	·
241	SKYNAP	4	9999	·	·	·	·	·	·	·	·
242	SkyNet360	1	9999	✓	·	·	✓	·	·	·	·
243	Sling Broadband	1	9999	✓	·	·	·	·	·	·	✓
244	Smart City	1	4381505	✓	✓	·	·	·	✓	·	·
245	Smartresort Co, LLC	2	17103979	·	·	·	·	·	·	·	·
246	SmartWires	4	9999	·	·	·	·	·	·	·	·
247	Southeastern Services, Inc.	4	10211167	·	·	·	·	·	·	·	·
248	Southern Light	4	6694111	✓	✓	·	✓	·	·	·	·
249	Spacenet, Inc.	4	4314704	·	·	·	·	·	·	·	·
250	Speakeasy DSL	4	9999	·	·	·	·	·	·	·	·
251	Sprint	1	3774593	✓	✓	·	✓	·	·	·	·
252	Sprint Broadband Direct	4	9999	·	·	·	·	·	·	·	·
253	StarBand Communications, Inc.	1	5087457	✓	✓	·	✓	·	·	·	·
254	Stratos Offshore Services Company	4	2147353	·	·	·	·	·	·	·	·
255	Summit Broadband	1	8410102	✓	✓	·	✓	·	·	·	·
256	Sun Digital Computers & Services	4	9999	·	·	·	·	·	·	·	·
257	Sun-Tel USA	2	18079152	·	·	·	·	·	·	·	·
258	Surferz.Net	4	9999	·	·	·	·	·	·	·	·
259	Suwannee Valley Internet	4	9999	·	·	·	·	·	·	·	·
260	SVIC Internet & Computers	4	9999	✓	✓	·	✓	·	·	·	·
261	Systemlink Broadband	4	9999	·	·	·	·	·	·	·	·

BROADBAND Florida

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262	T1 Shopper	4	9999	·	·	·	·	·	·	·	·
263	TDS Telecom	1	1824689	✓	✓	·	✓	·	·	·	·
264	Teccom USA	4	9999	·	·	·	·	·	·	·	·
265	Telcomprice.Com	4	9999	·	·	·	·	·	·	·	·
266	Telefonica USA, Inc.	2	18547828	·	·	·	·	·	·	·	·
267	Telovations, Inc.	4	15331390	·	·	·	·	·	·	·	·
268	TerraNova Net Internet Services	1	16098147	✓	·	·	·	·	·	·	✓
269	Terranovus.net	4	9999	·	·	·	·	·	·	·	·
270	The City of Daytona Beach	4	18522409	·	·	·	·	·	·	·	·
271	The Hometown Network, Inc.	1	19072339	✓	✓	·	·	✓	·	·	·
272	The Ultimate Connection, LLC	2	4557724	·	·	·	·	·	·	·	·
273	Tier 3 Communications; Ft. Myers Telephone; Naples Telephone	1	8882979	✓	·	·	·	·	·	·	✓
274	T-Mobile	1	6945950	✓	✓	·	✓	·	·	·	·
275	Total Access Networks, Inc.	4	9999	·	·	·	·	·	·	·	·
276	Towerstream, Inc.	4	7097355	·	·	·	·	·	·	·	·
277	Transbeam Inc.	4	8904690	·	·	·	·	·	·	·	·
278	Trillion Digital Communications	4	9999	·	·	·	·	·	·	·	·
279	Triple Crown Communications	4	9999	·	·	·	·	·	·	·	·
280	TSISP.NET	4	9999	·	·	·	·	·	·	·	·
281	TW Telecom of Florida LLC	1	4351466	✓	✓	·	✓	·	·	·	·
282	Ultrawave Technologies	4	9999	·	·	·	·	·	·	·	·
283	Umbrella Wireless	4	9999	·	·	·	·	·	·	·	·
284	University Corporation for Advanced Internet Development	4	9999	·	·	·	·	·	·	·	·
285	UNUM Telecommunications, Inc.	4	9999	·	·	·	·	·	·	·	·
286	US Metropolitan Telecom, LLC	1	16713497	✓	·	·	·	·	·	·	✓
287	USA Airnet, Inc.	4	9999	·	·	·	·	·	·	·	·

BROADBAND Florida

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288	Utilities Commission, City of New Smyrna Beach, FL	4	18603779	·	·	·	·	·	·	·	·
289	Valparaiso Communication System	1	9999	✓	·	·	·	·	·	·	✓
290	Velocity Online	1	16126971	✓	·	·	·	·	·	·	✓
291	Verizon	1	12254363	✓	✓	·	·	✓	·	·	·
292	Verizon Wireless	1	3290673	✓	✓	·	✓	·	·	·	·
293	Vortex Broadband	4	9999	·	·	·	·	·	·	·	·
294	Wave2Wave Communications Inc.	2	15329394	·	·	·	·	·	·	·	·
295	WebNet	4	9999	·	·	·	·	·	·	·	·
296	WildBlue Communications	1	7843766	✓	✓	·	✓	·	·	·	·
297	WilTel Communications, LLC.	4	3716511	·	·	·	·	·	·	·	·
298	Wind Serve	4	9999	·	·	·	·	·	·	·	·
299	Windstream Florida, Inc.	1	4967360	✓	✓	·	✓	·	·	·	·
300	Wireless Broadband, Inc.	4	9999	·	·	·	·	·	·	·	·
301	Wireless Online Services	4	9999	·	·	·	·	·	·	·	·
302	Wireless Roanoke, Inc.	4	9999	·	·	·	·	·	·	·	·
303	Wireless Web Access, Inc.	4	9999	·	·	·	·	·	·	·	·
304	wisbin	4	9999	·	·	·	·	·	·	·	·
305	WISP Networks	4	9999	·	·	·	·	·	·	·	·
306	WiVo	2	9999	·	·	·	·	·	·	·	·
307	WorldCom Broadband	4	9999	·	·	·	·	·	·	·	·
308	WPMedia	4	9999	·	·	·	·	·	·	·	·
309	www.AmericanAngel.us	4	9999	·	·	·	·	·	·	·	·
310	Xecu.net	4	9999	·	·	·	·	·	·	·	·
311	XO Communications Services, Inc.	1	6275945	✓	·	·	·	·	·	·	✓
312	XP Internet	4	9999	·	·	·	·	·	·	·	·
313	Xtremeaccess	4	9999	·	·	·	·	·	·	·	·

BROADBAND Florida

Broadband Provider Status Log

No.	Filing Company DBA	Provider Type: Broadband=1, Reseller=2, Other=3, N/A=4	FRN	Viable Provider	Data Included in Submission	Responsive				Non-Responsive	
						Refused to Participate	Submitted Updated Data	No Change in Data	Missed Deadline; No Data Included in Submission	Data from previous submission included	No Data Included
314	YEYZOO.NET	4	9999	.	.	.	.	.	.	.	.
315	YLISP (Your Local ISP)	2	9999	.	.	.	.	.	.	.	.
316	YourT1Wifi.com	4	9999	.	.	.	.	.	.	.	.
317	ZOOM Internet Services, LLC	4	9999	.	.	.	.	.	.	.	.
Total				77	44	3	29	6	3	8	28

The new providers since last data submission include: Southern Light, LLC, Level 3 Communications, Starband Communications, SVIC Internet & Computers, and Kiscompusys, Inc. DBA Areyouonline.Net Inc.

Georgia Broadband Mapping

Data Submission Methodology Report

April 1, 2013

1935 Jamboree Drive
Colorado Springs, CO 80920

Georgia Technology Authority
47 Trinity Avenue S.W.
Atlanta, GA 30334-3404

Georgia Broadband Mapping

Data Submission Report (April 1, 2013)

Table of Contents

1 Introduction

This report is submitted along with the seventh data submission for the Georgia Broadband Mapping Project. This submission includes all data collected so far per the requirements of the National Telecommunications and Information Administration (NTIA) State Broadband Data and Development Grant Program (Docket No. 0660-ZA29) Notice of Funds Availability (NOFA) and Clarifications to it. Specifically, it includes broadband data collected from broadband providers and Community Anchor Institutions data compiled from various sources for the State of Georgia. The State of Georgia has retained a mapping contractor, primed by the Sanborn Map Company (Sanborn), and supported by Applied Geographics Inc. (AppGeo) to support the Georgia Technology Authority (GTA) related to the Mapping Grant for this project.

This document provides an overview of the Team's progress, processes, assumptions, challenges and improvements needed for each dataset. Section 2 of this document explains overall project status at the time of this submission. This is followed by detailed description of the processes of data collection, data processing, and data validation. We have included with this report a section on detailed data processing for this submission. In the next section, the report documents all changes to the data model so far. The final section provides a list of providers that fall in various categories of participation.

2 Overall Project Status

Sanborn was selected as the new Mapping Contractor for State of GA and contract was signed on January 14, 2013. After the kick-off meeting between Sanborn and GTA (held January 23rd, 2013), work on the program commenced and letters to providers were sent on February 1st, 2013.

In this submission, the following high level statistics represent the degree of participation and data updates from existing broadband providers and newly added providers. The breakdown of these providers in different categories is summarized below and detailed lists are provided in the last section of this report (Section 2.6).

Provider - Data Status - Submission 7	Count
Total Providers Researched/Contacted	203
Non-providers	34
Resellers	8
Total Valid Providers (total participating + non-cooperative but valid providers)	101
Non Responsive Providers	20
Non-cooperative Providers (refused participation)	16
Number of DBAs Represented in Data (not including the 5 companies that had no FRNs)	89
Number of Providers that Supplied Updates	47
Number of Providers – Confirmed No Updates	15
Number of Providers – No updates and no confirmation	22

2.1 DATA COLLECTION

This section details data collection related to NTIA deliverables which include broadband data and community anchor institution data.

2.1.1 **Broadband Data**

Sanborn acquired the most recent NTIA submission data (i.e. Submission 6 submitted to NTIA on October 1, 2012). We moved all the S6 data onto our provider portal and created usernames and passwords for each participating provider so that they could make edits to their service area. Sanborn and GTA held a web conference call to introduce the new team to the Georgia broadband providers and provide online training to them as well. Sanborn also held numerous technical one-on-one calls/training sessions with providers and also explained the program requirements and the type of data we needed from them.

We also created a Technical Requirements document based on the NOFA requirements and changes that have been made to date. This document included specific details on data formats, alternative formats, schema, data delivery, etc. and was accessible through the Provider Portal and also provided to Broadband Providers as needed.

The Sanborn team then followed up by calling all providers identified (including participating providers, those who have refused participation, resellers, and newly identified providers). Sanborn began with the FCC Form 477 Broadband Data Filers as of June 30, 2011. This list had 130 providers for the State of Georgia. During the first year of the program, when Sanborn was the mapping vendor, we already had valid open-ended confidentiality agreements with many providers. New confidentiality agreements were executed with companies that were new in this submission or wanted new Non-Disclosure Agreements (NDAs). New confidentiality agreements were executed although some companies chose to provide us data without an NDA. We have a total of 86 executed NDAs for the State of Georgia.

According to both our research and lists provided to use by NTIA, there was the potential for Georgia to have up to 203 broadband providers. The breakdown of these providers in different categories is summarized below and detailed lists are provided in the last section of this report (Section 2.6).

Of these:

- 34 companies stated that they do not provide any type of broadband service in Georgia. Many of these are either national carriers without a Georgia presence, or they file 477 reports because they provide VOIP or Video Teleconference services (but not broadband).
- 40 company names turned out to be a DBA or legal holding names for another firm that is listed in another category. These duplicates were dropped from our list.
- 8 companies are resellers and are not considered part of this program.
- 36 companies may be broadband providers, but either they indicated they are not willing to provide data, or were completely unresponsive to multiple attempts to contact them.
- 37 broadband providers informed us that there were no changes to their service area so for these providers we downloaded the data that had been submitted as part of the last submission, reprocessed the data, performed validation on it, and we are resubmitting this data:
- 47 Broadband providers submitted either entirely new or partially new datasets for this submission.

- 1 provider submitted Linear Middle Mile data that is not being submitted to NTIA (this provider will make the count of total providers to 204 for GA)

A total of nine new providers have been added to this submission:

- MetroPCS Georgia, LLC
- TruVista
- Northland Cable Properties Eight Limited Partnership (with two different Provider Names)
- North Georgia Networks
- Trenton Telephone Company
- Public Service Data Wireless
- FiberLight
- Dalton Utilities
- Appalachian Valley Fiber Network

All changes and corrections in provider data are documented in the Change and Correction Document submitted with this submission.

In general, the submission 7 processes followed the same basic approach that was used in previous submissions made by Georgia. This document provides further details on the following topics:

1. Submission 7 Processing Assumptions
2. Reference Data Creation
3. Processing of New Provider Data
4. Quality Control Checks
5. Improved Validation Techniques
6. NTIA Quality Control Scripts
7. NTIA Submission Data Model Schema Changes

Based on NTIA feedback and information provided in NTIA webinar sessions, the submission 7 data processing workflow is created with the following assumptions to meet NTIA submission requirements.

1. All census blocks and road segments are mapped based on 2010 census data set.
2. Due to our NDA restrictions, address points and last mile points are not being submitted to NTIA.
3. Terrestrial Mobile Wireless and Terrestrial Fixed Wireless (licensed and unlicensed) were again treated as wireless coverage and were delivered as a shape. In cases where a provider served the same spectrum with different speeds, overlapping areas were removed and the higher speed was assigned. The exception to this rule is where a provider is using the same spectrum, but delivering different underlying technologies such as

3G, 4G, or 4G LTE. In this case a continuous polygon is being created that represents the area that is offered for both 3G and 4G even if these polygons overlap.

4. If a cable based wireline provider can provide both DOCSIS 2.0 and DOCSIS 3.0 service to the same area, the block or road was listed only once, with a technology code of 40.
5. Providers were only willing to indicate on a general level if they serviced business, residential or both. None of the providers broke down their type of service by block. Where providers stated or we knew from local sources what kind of end users the provider served, we filled in the "category of end user" with a code of 1 or 2. For the remainder, we made an assumption of 5.
6. The submission 7 Provider data model is currently based on the NTIA December 2012 data package.
7. The weighted average speed alternate format which was originally part of the NOFA was not provided, per NTIA's direction.
8. Wireless coverage was provided with unique shapes for each spectrum utilized.
9. If provided, Franchise Area was captured during the ingest process, and kept for use during the validation process. These areas are not being submitted to NTIA.
10. All Provider data and Community Anchor Institutions (CAI) locations were clipped to the state's boundary.
11. Records dropped during data processing will have an associated reason code. Dropped records were maintained in a separate similarly formatted dataset and given to the providers so they had an opportunity to correct any issues. Records without required attributes were not submitted to NTIA.

12. **In this submission, for landline broadband, we removed blocks and roads that are in water-only census blocks. We communicated this to providers at the beginning of data collection to make sure they would let us know if they really served on blocks that were water only and no population (i.e. situations of docks or houseboats or other unforeseen situations).**
13. **It was not clear to Sanborn what criteria were used by previous vendor to identify blocks that were less than 2 square miles (census published numbers vs. calculated areas from feature geometry). Sanborn has always used the census published numbers for the area cut-off by adding land and water area. This created some changes in the data where in some cases roads needed to be submitted instead of blocks and vice-versa.**
14. Where providers told us to reuse data from the previous submission or did not respond to our data request, we are resubmitting data that was

submitted in S6. Because of the removal of water polygons and the 2 sq. mile criteria for blocks, we have some differences in counts for roads and blocks even when no data updates were submitted by a provider.

15. In the final stages of processing this submission, we noticed that some providers are delivering street segments that appear to be new roads, constructed since the 2010 data were created, but not represented in the official Census 2010 geometry data. These roads were dropped from the submission, but we are going to look into a process to add these roads to the next submission if they can be verified as accurate. Some guidance on this from NTIA may be useful so all states submit the data consistently.
16. In this submission, we also found that some providers were using street segments that collapsed multiple census streets into a single segment. We have used manual processes to select roads in the census data for such providers.
17. This submission is being made based on the NTIA data model as of Dec, 2012 provided by NTIA on the SBDD site.

2.1.2 Community Anchor Institutions Data

In this submission, Georgia is supplying a substantially increased CAI dataset. The state has outsourced telecommunications services for internal needs to AT&T. GTA was able to obtain a list of all locations serviced under this contract and the level and type of service provided at each location. This new data provides almost 2000 additional CAI data points across 260 customers.

2.2 DATA PROCESSING

We started with the following base data:

Census Blocks:

For Submission 7, Census 2010 data were utilized. The data were set up as follows:

- Block size (AREA) is calculated combining the 2010 land area (ALAND) and water area (AWATER)
- AREA is converted from square meters to square miles to calculate square mileage (SMI).
- If the SMI of a block is less than or equal to 2, then the less than or equal to 2 square mile indicator (LE2SMI) is set to true.

Road Segments:

2010 Tiger Line IDs (TLID) were used for data processing for this submission. The data were set up as follows:

- The GT2SMI (Greater Than 2 Square Mile) indicator is set to True when:
- The 2010 road segment is completely within a block that is NOT less than 2 square miles
- Only minimum and maximum address ranges and a single zip code for each road segment is maintained.

All data received went through the following processing steps:

Triage: All new data were quickly reviewed to understand what was received, and in what format. We also made sure we had all the required components for NTIA's data model, such as their FRN and advertised speed information. We also screened for any known issues that we might have seen before (such as Excel 2003 spreadsheets that cut off at 32k rows.)

Ingest: At this time the data are actually brought into our systems. Each provider is set up with a unique file geodatabase to store their information. Record counts of what was received is logged so that we can validate we did not drop anything in processing.

Data Processing: This is where the data goes through a number of Extract, Transform, Load (ETL) routines to convert the raw proprietary information into a format similar to the NTIA format. The exact routine utilized depends on how the data are received:

1. When a wireline provider submits a service boundary, we select all the blocks and roads that are within and cross that shape.
2. If a wireline provider submits a customer address list, the points are geocoded, and then the appropriate block or road segment is selected.
3. If a wireline provider submits block and road information using Census data, we make sure everything is formatted to the appropriate specifications
4. If the wireline provider submits any type of road or line data that does not direct correlate to the TIGER data set, we convert the lines to TIGER by selecting the road centroid and spatially selecting the closed segment in our data set. If the road is in a block less than 2sqmi, than the block is selected. Some manual cleanup is also applied to make sure we do not accidentally drop any road segments that should have been processed.
5. Wireless provider data are formatted to ensure that there are no overlapping polygons with the same technology type unless the provider

is offering different speeds such as 3G and 4G over the same area. In addition the data are cropped to the state boundary.

6. After each round of processing, we make sure that we only keep unique records. A unique record is defined as having a one–of-a-kind combination of FRN, Block/Road ID, and technology type. If there are multiple records with different speeds, but all else is equal, then we select the maximum of the advertised speeds.

QC Review: All data are then sent to a different analyst to perform a thorough quality control review on the processed data set. Record counts are compared to what was submitted. The QC staff also makes sure the ETL scripts and routines populate all of the right fields.

QC Change Detection Review: Data are then sent to another team for a second Quality Control Review. In this step the data are not only double checked against what was originally submitted, but it also brought up inside standardized MXD templates that allow us to make sure our results make sense. This step involves comparing the new data set with prior submissions, developing change maps, and looking for any possible technology or speed anomalies. At this stage we also begin our validation process. This includes looking at the provider data in comparison to things such as speed test results, franchise boundaries, siting information, and feedback from the planning surveys.

Provider Review: Processed data are all posted to a customized web application we refer to as our Provider Portal. All providers were notified once their data were available in the site, and they were always given time to review the data and respond. In this site, providers can log on and visually see their processed data in a map format. It also allows them to overlay their raw data (boundaries or addresses provide in any format) to help them validate that we did indeed process things correctly. The provider portal also has a suite of markup tools that will allow the providers to edit their data, including adding or removing service areas, and making changes to the data attributes.

Comment Processing: All comments and feedback received from the provider portal, is then reviewed and applied to the processed data set. This updated data set goes back through our QA and QC processes, and if time allows, back out to the Provider Portal, for the provider to review and sign off on.

Data Append: After all of the individual data sets are processed and approved, we run an append process which merges all of the individual provider data sets into one geodatabase. This is also the point where our team will do any final transformations to get our working data model into the latest NTIA publishing format.

Submission Comparison Check: Starting with this submission an additional check was added to our quality review process. An application was written that compares the individual provider's unique data that is stored in their unique file to that which is stored in our final appended file and the NTIA submission data. Any variation in each of these data files in thoroughly investigated and resolved. This was done to assure no data loss or data transformation issues. We also compare this submission to the previous submission, review any variations and assure that the changes found can be documented as being requested by the provider.

Final QA/QC: A series of quality checks are run on the final appended data sets to ensure it is ready for submission to NTIA. We also run the latest version of the NTIA receipt tool at this time. If any issues are flagged as failing they are reviewed and corrected. All warnings are also reviewed and either corrected or documented in the attached document which explains that we have validated this data and it should be accepted. Any last issues are corrected, and the data are sent to the state for their review.

Submission to NTIA

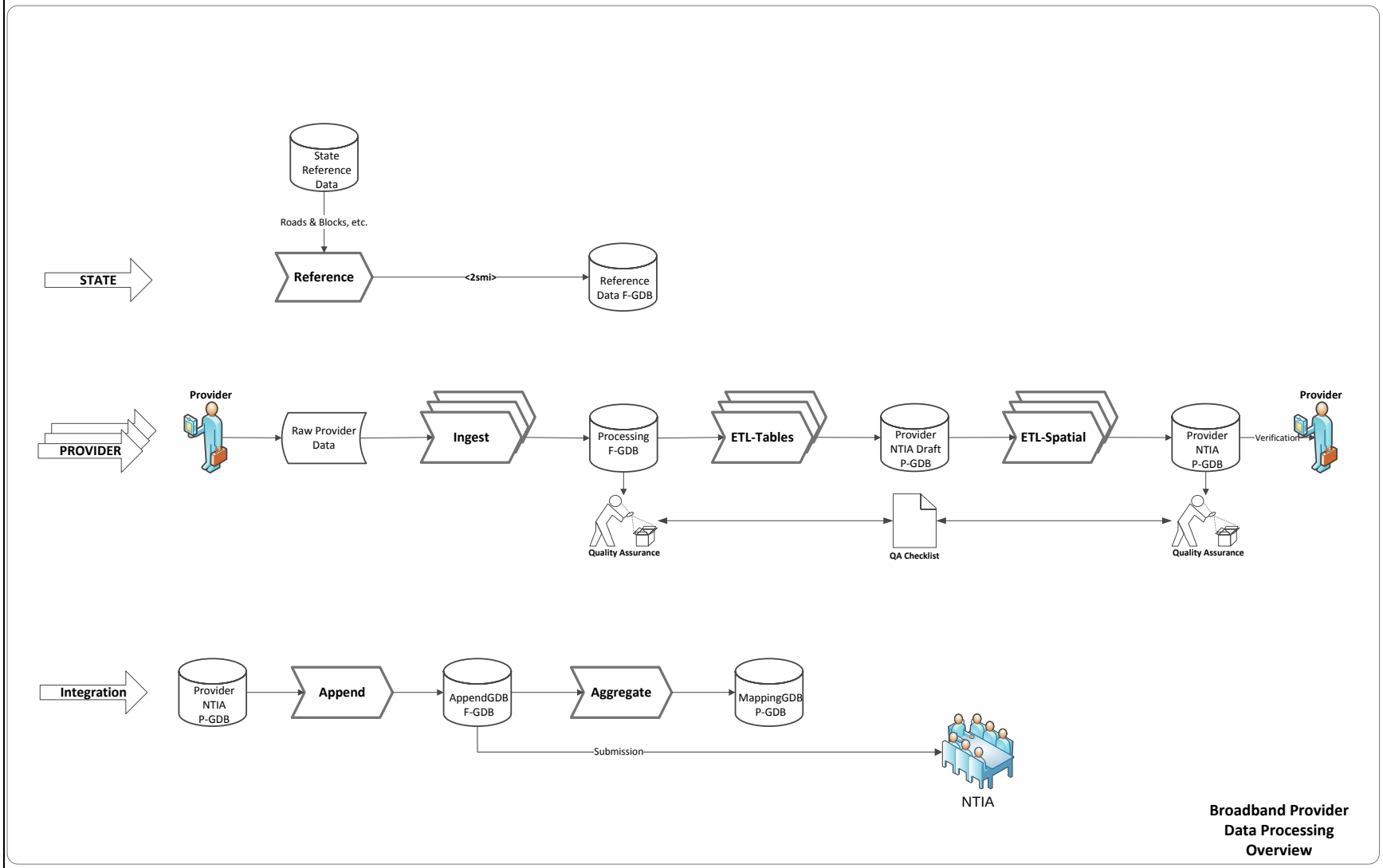
2.3 DETAILED DATA PROCESSING

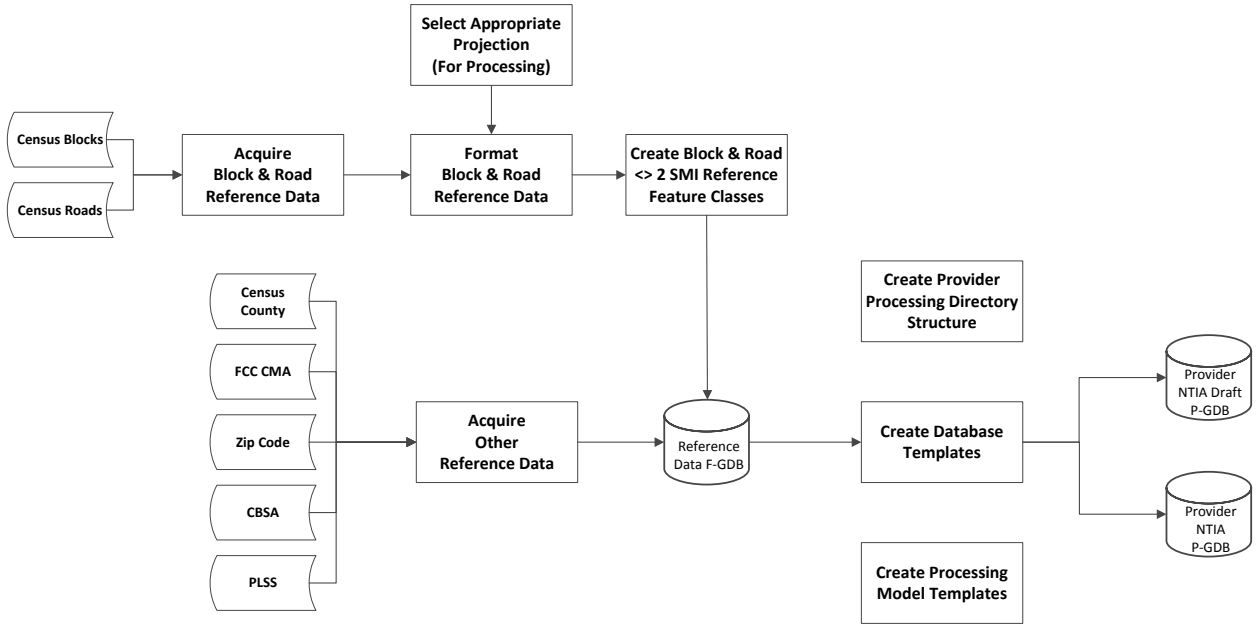
2.3.1 General Overview

The Data Processing Team is tasked with receiving data directly from each State's broadband providers and carrying that data through a series of spatial and database transformations that result in a standardized, aggregated database ready for submission to the State and to NTIA. The key phases that make up this critical process are:

1. Initial State Set Up Phase
2. Provider Processing Phase
3. Integration Phase

Each of these phases is described in detail below and represented graphically on Figure 1.


State Reference Data
Roads & Blocks, etc.
STATE
Reference
<2smi>
Reference Data F-GDB
PROVIDER
Provider
Raw Provider Data
Ingest
Processing F-GDB
ETL-Tables
Provider NTIA Draft P-GDB
ETL-Spatial
Provider NTIA P-GDB
Verification
Provider
Quality Assurance
QA Checklist
Quality Assurance
Integration
Provider NTIA P-GDB
Append
AppendGDB F-GDB
Aggregate
MappingGDB P-GDB
Submission
NTIA
Broadband Provider Data Processing Overview


Select Appropriate Projection (For Processing)
Census Blocks
Census Roads
Acquire Block & Road Reference Data
Format Block & Road Reference Data
Create Block & Road <> 2 SMI Reference Feature Classes
Census County
FCC CMA
Zip Code
CBSA
PLSS
Acquire Other Reference Data
Reference Data F-GDB
Create Provider Processing Directory Structure
Create Database Templates
Create Processing Model Templates
Provider NTIA Draft P-GDB
Provider NTIA P-GDB
Broadband State Setup

2.3.2 **Initial State Set-Up Phase**

An overview of the Initial State Set-up phase and processing is shown in Figure 2. For every submission for each State, the team completes a series of setup steps to ensure that necessary reference data are acquired from the State or US Census Bureau and then prepared to support later spatial analysis. The results of this set up phase are maintained in the **Reference Data Personal Geodatabase**. The following steps are followed to accomplish this phase:

1. Acquire Census Block and Road Reference Data
2. Select Appropriate Projection for Processing
3. Format Block and Road Reference Data

Blocks

- For each Census block compute the total area by summing the water area and land area values
- Convert total area to square miles (from square meters)
- Compute and populate column to indicate that the block is < 2 square miles in area (islt2smi)
- Add NTIA standard columns to the block reference data set
- Rename columns to Block_* for easier identification during processing
- Output all blocks into the state reference database

Roads

- Add NTIA standard columns to the block reference data set
- Rename columns to Road_* for easier identification during processing
- Perform a spatial join (intersect with lt2sqmi) then compute and populate column to indicate that the road segment is in a block that is greater than 2 square miles in area (isgt2smi)
- Output all roads into the state reference database

1. **Create Block and Road Greater Than or Less Than 2 Square Miles Reference Data**

The size of each Census Block is the key factor in determining the spatial format (block or road) for final submission, thus the initial setup phase includes categorization of reference data according to area in square miles. Provider service coverage data for areas represented by blocks that are less than 2 square miles is processed as block features. Provider service coverage data for areas represented by blocks that are greater than 2 square miles is processed as Tiger Line road segments features. Therefore, we output blocks that are less than 2 square miles in area. (**lt2smi**)

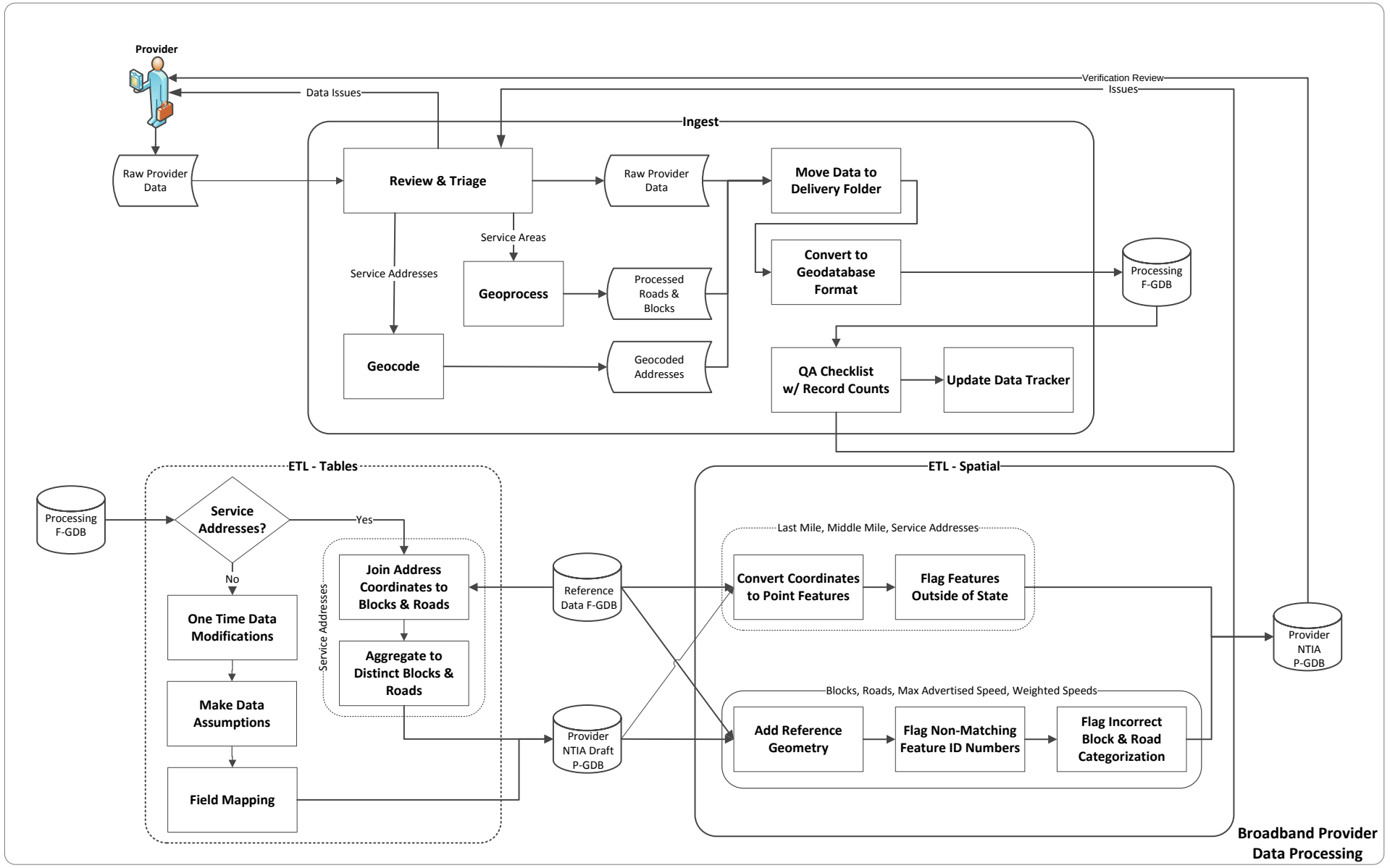
2. **Create Database Templates**

To ensure consistency across providers and to increase the potential for process scripting, template geodatabases are created. In addition to the Reference Data File Geodatabase described above, there are four additional geodatabases used in processing:

- Provider Processing File Geodatabase
- Provider NTIA File Geodatabase
- NTIA Append Geodatabase
- Mapping Aggregation Geodatabase

3. **Create Processing Model Templates**

After these steps are complete, the processing of individual provider data sets can begin.


Provider
Data Issues
Verification Review Issues
Ingest
Raw Provider Data
Review & Triage
Raw Provider Data
Move Data to Delivery Folder
Service Areas
Service Addresses
Geoprocess
Processed Roads & Blocks
Convert to Geodatabase Format
Processing F-GDB
Geocode
Geocoded Addresses
QA Checklist w/ Record Counts
Update Data Tracker
ETL - Tables
ETL - Spatial
Processing F-GDB
Service Addresses?
Yes
No
Last Mile, Middle Mile, Service Addresses
Join Address Coordinates to Blocks & Roads
Service Addresses
Reference Data F-GDB
Convert Coordinates to Point Features
Flag Features Outside of State
Provider NTIA P-GDB
One Time Data Modifications
Aggregate to Distinct Blocks & Roads
Make Data Assumptions
Blocks, Roads, Max Advertised Speed, Weighted Speeds
Provider NTIA Draft P-GDB
Add Reference Geometry
Flag Non-Matching Feature ID Numbers
Flag Incorrect Block & Road Categorization
Field Mapping
Broadband Provider Data Processing

2.3.3 Provider Processing Phase

The Provider Processing Phase is described below in details and also shown in the Figure 3 above. Following the initial set up, the team processes the provider data to bring it from its "raw" format to a standardized file Geodatabase format. This process is repeated and checked until each data set is successfully carried through each step.

1. **Review and Triage**

The ingest process begins upon receipt of raw data from the State's providers. Data are routed for initial geoprocessing based on data format. Any issues that surface during the initial triage will trigger a request for additional information and clarification from the Provider.

2. **Data Processing**

The following sections of the document described the workflow for each dataset.

Address Data Processing

1. Ingest Address Data

If service address locations are supplied by the Provider, these data will **be geocoded to** the reference data resulting in address point data in a Geodatabase format. We have an 85% geocode rate as a cut-off – and if such a rate is not achieved through an automated geocoding, we then will manually geocode the data. The geocoding is done using a gecoder based on the US Census TIGER 2010 street centerline data. These data are then also stored in the **Delivery Folder** according to provider name and delivery date. Address points are then imported to the **Processing File Geodatabase** along with all other data supplied by that Provider on that date. A set of **quality control checks** are performed on the address data including:

- Visual review to confirm address locations are within the state boundary and there are no incorrect outliers.
- Required attribute fields are present
- Latitude and Longitude are appropriate (not inverted)

2. Extract, Transfer, Load (ETL) Tabular Address Data

Address point data requires additional **geoprocessing** to convert the points to either block or road data in preparation for submission to NTIA.
One time Data Modifications are as follows:

- Address points are re-projected to allow spatial join with State reference data
- Using state reference data, address points are spatially joined to block polygons.
- Resulting blocks and roads are aggregated according to the project specifications.
- The output from these tabular ETL processes is the Provider NTIA Draft File Geodatabase.

3. Extract, Transfer, Load (ETL) Spatial Address Data

Reference geometry is now added to the address data (which has been aggregated into block and road records during the tabular ETL processes). Reference geometry is added by spatially joining State reference data.

- Non-matching Feature Identification Numbers are flagged.
- Inappropriately categorized data are flagged.

These processes result in the **Provider NTIA File Geodatabase** in NTIA format with all attribute and spatial elements.

- Address point features are added to the Provider NTIA File Geodatabase.
- The Provider NTIA File Geodatabase is given to Providers for review and verification via the web-based Provider Portal.

Street Segment Data Processing

- Ingest Street Segment Data
    a) Street segment data are typically supplied by the Provider as tabular data.
    b) These data are stored in the **Delivery Folder** according to provider name and delivery date.
    c) Data are then converted to a **File Geodatabase format**.
    d) A series of **quality control checks** are performed on the street segment data.
- Extract, Transfer, Load (ETL) Tabular Street Segment Data
    a) One-time Data Modifications
    b) Data Assumptions
- The Team assumes all data are 2010 TIGER Line Identification Numbers.
- Data table fields are then mapped to fields in the NTIA Draft Geodatabase format.
- The output from these ETL processes is the creation of database in NTIA format that does not yet have associated spatial features. This is the Provider NTIA Draft File Geodatabase.

- For block and road data, if advertised speeds have not been provided for all the records, the team verifies that a Maximum Advertised Speed feature class exists with this information based on an approved alternate geography.
- When Maximum Advertised Speed is provided in an alternate format per the Clarifications to the NOFA
  (e.g. by franchise area, service area or CMA) – the team has not back-filled the speed information into the block dataset because providers have told us that they may not be able to provide at those speeds at the individual block level.
- When the same provider provides on the same block with multiple technologies of transmissions, providers have been asked to provide two separate records for the same block representing the two technologies of transmission.
- Where TLIDs are present, data may or may not be present in the Segment_Min_Address etc. fields – by joining on TLIDs, such data can be populated in future
- The Minimum and Maximum Address values have been calculated from From and To Address on the left and right of street segments (as in the TIGERLINE data) and often the minimum can be more than the maximum based on the direction of digitization.
- Extract, Transfer, Load (ETL) Spatial Street Segment Data
    a) Reference geometry is now added to the street segment data through attribute join using the TIGER Line ID number and available State reference data.
    b) Many-to-one relationships are resolved so that every record has an associated shape and a valid TIGER Line ID number.
    c) Non-matching Feature Identification Numbers are flagged.
    d) Inappropriately categorized data are flagged.
    e) These processes result in the Provider NTIA File Geodatabase in NTIA format with all attribute and spatial elements.
    f) The Provider NTIA File Geodatabase is given to Providers for review and verification via the web-based Provider Portal.

Census Block Data Processing

1. Ingest Census Block Data
    a) Census block data are supplied by the Provider.
    b) These data are stored in the Delivery Folder according to provider name and delivery date.
    c) Data are then converted to File Geodatabase format.
    d) A series of quality control checks are performed on the census block data including:

e) Data are checked to verify whether vintage is 2000, 2009 or 2010.
f) Required attribute fields are present including Provider Name, DBA, FRN, Record Number, and Census Block Number

2. Extract, Transfer, Load (ETL) Tabular Census Block Data
    a) Data Assumptions
        - Team calculates the State, County, Census fields from the full block ID
        - When Maximum Advertised Speed is provided to us in an alternate format per the Clarifications to the NOFA (e.g. by franchise area, service area or CMA) – the team has not back-filled the speed information into the block dataset because providers have told us that they may not be able to provide at those speeds at the individual block level.
    b) When the same provider provides on the same block with multiple technologies of transmissions, providers have been asked to provide two separate records for the same block representing the two technologies of transmission.
    c) Data table fields are then mapped to fields in the NTIA Draft Geodatabase format.
    d) The output from these ETL processes is the creation of database in NTIA format that does not yet have associated spatial features. This is the Provider NTIA Draft File Geodatabase.
3. Extract, Transfer, Load (ETL) Spatial Census Block Data
    a) Reference geometry is now added to the census block data through an attribute join using the Census Block ID numbers and State reference data.
    b) For records that came in as Census 2000 or 2009 format, they are compared to a dissolved reference set that uses the 2010 geometry and the 2010 block numbers.
    c) Non-matching Feature Identification Numbers are flagged. The team puts unmatched records in a separate 'dropped records' table, once for each feature type.
    d) Inappropriately categorized data are flagged.
    e) These processes result in the Provider NTIA File Geodatabase in NTIA format with all attribute and spatial elements.
    f) The Provider NTIA File Geodatabase is given to Providers for review and verification via the web-based Provider Portal.

Wireless Service Area Availability Data Processing

1. Ingest Wireless Service Area Availability Data
    a) Wireless Service Area Availability data are supplied by the Provider typically as shapefiles or tables.

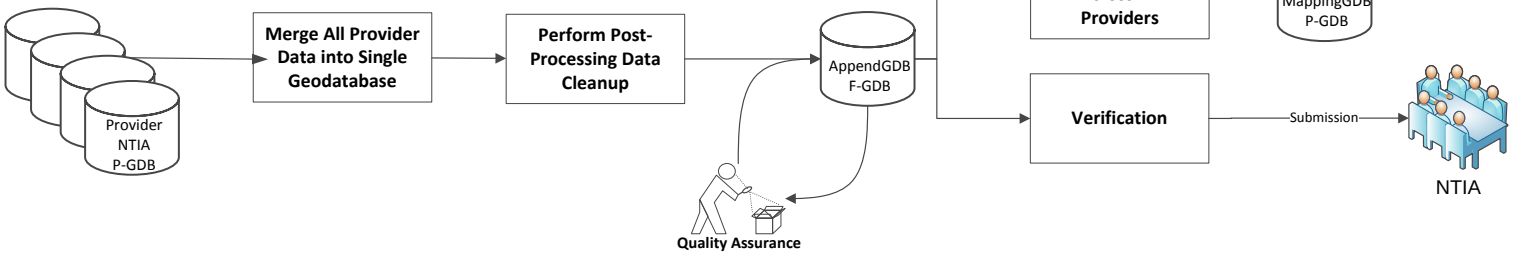
b) These data sets are also stored in the Delivery Folder according to provider name and delivery date.
c) Data are then converted to File Geodatabase format.
d) A series of quality control checks are performed on the census block data including:
    - Visual review to confirm whether features are within state boundary
    - Required attribute fields are present including Provider Name, DBA, FRN, Technology Transmission, Spectrum, and Maximum Advertised Downstream Speed

2. Extract, Transfer, Load (ETL) Tabular Wireless Service Area Availability Data
    a) One-time Data Modifications
        - Project data to WGS-84 Web Mercator
        - Spectrum data are translated from correspondence if not included in data.
    b) Data table fields are then mapped to fields in the NTIA Draft Geodatabase format.
    c) Topology is run on the data for each provider for no overlaps.
    d) The output from these ETL processes is the creation of database in NTIA format. This is the Provider NTIA Draft File Geodatabase.
3. Extract, Transfer, Load (ETL) Spatial Wireless Service Area Availability Data
    a) Spatial ETL process does not occur for Wireless Service Area Availability Data. Draft data are copied into Provider NTIA File Geodatabase.

Infrastructure Data Processing

1. Ingest Infrastructure Data
    a) Infrastructure data are typically supplied by the Provider as a table or shapefile.
    b) These data are then also stored in the Delivery Folder according to provider name and delivery date.
    c) Data are then converted to File Geodatabase format.
    d) A series of quality control checks are performed on the infrastructure data including:
        - Required attribute fields are present including Provider Name, DBA, FRN, Technology Transmission, Latitude, Longitude
2. Extract, Transfer, Load (ETL) Tabular Infrastructure Data
    a) One-time Data Modifications
    b) Data Assumptions

        - The team calculates the State, County, Census fields from the full block ID
    c) Data table fields are then mapped to fields in the NTIA Draft Geodatabase format.
    d) The output from these ETL processes is the creation of database in NTIA format that does not yet have associated spatial features. This is the Provider NTIA Draft File Geodatabase.
3. Extract, Transfer, Load (ETL) Spatial Infrastructure Data
    a) Points are created from Latitude/Longitude data
    b) Features outside of state boundary are flagged
    c) These processes result in the Provider NTIA File Geodatabase in NTIA format with all attribute and spatial elements.
    d) The Provider NTIA File Geodatabase is given to Providers for verification via the web-based Provider Portal.



Broadband Provider Data Integration

2.3.4 Integration Phase

The Integration Phase combines the individual Provider data sets into a single geodatabase for submission to NTIA.

Append

The Provider Processing phase produces a separate geodatabase for each Provider in NTIA submission format. The Append step compiles all of these data sets into a single geodatabase with rows for each provider, technology type, end-user category, etc. for each data set. This results in many duplicate (a.k.a. stacked) block and road features.

Following the compilation, quality checks are performed to ensure that all Provider data were transferred successfully into the appended geodatabase that contains the following feature classes:

- Area availability
- Census Blocks Less than 2 Square Miles
- Last mile
- Maximum Advertised Speed
- Middle Mile
- Road Segment Availability

Refer to the submission data model schema in this document for details about the columns contained in these feature classes of the append geodatabase. An additional post-processing performs final data validation steps across the full submission. For example, all data elements that have domain values and are null are set to the domain value that indicates that data were not provided. The append geodatabase is the format that is submitted to NTIA.

Aggregate

Following the Append step, the Aggregate step creates another geodatabase that is used for mapping and analysis purposes. For each data set in the append geodatabase, identical features from all Providers, technology transmission types, End-User Categories, etc. are rolled-up into a single, aggregated feature class. The duplicate blocks and roads are removed and the attributes are combined into a single row that describes the feature. This process produces a geodatabase that contains only block and road feature classes. Descriptive attributes for these feature classes include:

- Census Block ID number (blocks) or Tiger Line ID (Roads)
- Number of providers providing service to the feature area
- Maximum advertised downstream speed tier for that feature area
- Maximum advertised upstream speed tier for that feature area
- The number of providers providing service at each speed tier (to easily calculate served/underserved area)
- Number of providers providing service for each technology of transmission type

This data set also undergoes a series of quality control checks to ensure that no data were lost during the aggregation process.

Delivery to NTIA and Publishing to Web Applications

A copy of the **Append File Geodatabase** is generated to be used in the provider portal web-based application. When verification feedback is received, the individual provider geodatabases are updated. After verification is complete, the Append process, including QA steps, is executed again and then submitted to NTIA.

2.4 DATA VALIDATION

Sanborn has validated data using the following steps:

1. QC of the data at various steps – this includes when data are received (triage), when it is processed through the various processing steps discussed above, etc.
2. Spatial checks against public and commercial datasets
    a. For GA, we used Pitney Bowes exchange boundaries for validation. Any wireline providers whose areas fell outside the exchange boundaries were marked up in an issues database and the information about this was relayed to the provider. We will continue improving the data where providers did not respond in the next submission.
3. Speedtest data
    a. For this submission we used the FCC speed test data for validation. We geocoded the data, used the IP to reverse lookup the provider name and used it to check speeds where possible. We used the deadspot data to identify areas of no providers in our feedback to providers.

4. GTA provided a huge amount of local and previous knowledge in validating data. Sanborn created an Online Data Verification Tool for GTA to review the data. Issues identified by Sanborn through the above methods were already available for GTA to review and further feedback from GTA was reported to providers and data corrections were made where possible. In some cases, providers were non-responsive and we tabled some changes for next submissions. We feel that we addressed most major issues with the previous submission in this submission. A detailed list of issues identified, resolution and unresolved issues are provided as a separate tab in the Data Package for GA. Some examples of these verification discussions include:
    a. Zayo Group, LLC. This is a fiber provider and their service was marked as business only. All blocks that were obviously

serviceable only by their long-haul fiber were removed. Several attempts were made to contact them with these changes but no responses were forthcoming. Further improvements may be needed on this and we hope to engage the provider in the next submission.

b. Knology, Inc. / WOW. We removed their fiber offering from S6 based on feedback from GTA, discussions with the provider and using the guidelines developed for fiber mapping.
c. Comcast – Based on several communication attempts regarding claims of 100 mbps service in several rural areas of GA that are disputed by locals, Sanborn facilitated a meeting between Comcast and GTA. Comcast explained that they have made a huge investment upgrading their systems and a few counties (Hart and Elbert) were downgraded in speed based on that conversation. Both Comcast and GTA were agreeable to that resolution.
d. AT&T – There were some discrepancies in the total number of roads served by AT&T in past submissions vs. Submission 7. It is unknown to us what methodology was used in the previous submission that resulted in a submission of 33,289 roads to 10,810 roads. We have confirmed with AT&T that the data we have submitted for S7 correctly displays the actual road segments that are currently served by AT&T rather than a filling in of gaps.

5. Verification by providers – processed data are uploaded on our Provider Portal for providers to review both the outcome of data processing and any issues that we found in the third-party and GTA validation. Issues pertaining to a particular provider are highlighted and shown in the portal for those providers only. Issues that are global and cannot be assigned to a particular provider are shown to all providers (e.g. there are no providers in this area, or we tried to get service here and heard x from A provider, y from B provider, etc.). We have also made several additional calls to providers who have issues.

3 Submission 6: NTIA Submission Data Model Schema Changes

This section of the document describes the strategy that was used for the development of the specific data schema used for the NTIA submission 7 provider data. The current data model schema is as of Dec 2012 and as posted on the SBDD site.

3.1 Schema history and evolution

In submission 1, NTIA asked the National States Geographic Information Council (NSGIC) to comment and provide a spatial data model that can provide a common format for data submitted to NTIA. The initial NSGIC data model released had a number of flaws that clearly needed to be resolved.

NSGIC released version 2 of the data model close to the submission 1 delivery date. The new model had improved functionality and conformed more closely to the NTIA submission requirements. The NSGIC version 2 model was used as the basis for our internal processing models and for submission 2.

After submission 1, NTIA took ownership of the submission data model, but did not release any changes until mid-August. The NSCIG version 2 was used as the basis for our internal processing models. The submission 2 NTIA data model is similar to the NSCIG version 2 model.
To retain as much of the NSGIC v2 /NTIA spatial data model as possible, the relationship between the provider data and the output specification is kept as simple as possible. Here are a few key NTIA submission data model design considerations:

- Submission feature class names reflected the names in the NSGIC v2 specification
- Column data types are based on the NSGIC v2 specification
- Where possible, field names retained the naming conventions of the NSGIC specification
- All road segment address information used the NSGIC specification of a single min, max, zip for each feature
- The data schema for wireless data follows the NSGIC specification for submitting a single feature per spectrum
- To retain Provider Source Information the ID filed is calculated as State Name Abbreviation "_", Short Name. The ID field exists in the NSGIC v2 data model, but not the final NTIA submission 2 delivery model. This column is used during processing and was dropped during final processing, prior to submission to NTIA.

- Any Overview records that were not submitted using State-County codes were not delivered.

3.2 NTIA Data Model Changes Submission 2

During the processing of provider data for submission 2, a number of issues were raised about the data model requirements proposed by NTIA. A number of specific errors, such as typographical errors in domain values, or inconsistency surrounding processing of null values, etc., were documented and forwarded to NTIA for response. Based on changes made to the NTIA data model, some data processing procedures were required to populate the current NTIA data model. The following is a list of specific data processing changes that were implemented:

The following are the rules for removing records for the final NTIA submission:

- Basic Assumptions:
    - Remove any record that has a Maximum Advertised speed that did not meet the definition of Broadband
    - MaxAdv is only required in wireless
    - MaxAdv can be null in blocks/roads
- Criteria for removing records from Blocks/Roads (wireline)
    - Remove records with invalid MaxAdv speeds
- Criteria for removing records from Wireless
    - Remove records with invalid MaxAdv speeds
    - Remove records with null MaxAdv speeds

In addition, the following processing changes are now performed during post-processing and before the final NTIA submission:

- There is a new feature class called State Boundary. These shapes were prepared and added to the reference datasets for each state. For NTIA submission output, these were moved into their own feature class.
- The Blocks table has the Block ID separately defined as State, County, Tract, and Block ID. The provider data as processed include the full 15-digit FIPS code, which has been parsed to populate these fields.
- ID columns no longer exist. They have been dropped from the final processed data.
- The Middle Mile, Overview, and Wireless tables all have a field called StateAbbr (2 character alphabetic code). The final publishing script created and populated the StateAbbr field.
- In the Roads table, the Ref_ Values are used for Street info and Zip Code. Because the processing produces a null value for Ref_City, the City field is populated with Dlv_City.
- TransTech was converted from string to small integer.

- Any record with a TransTech value of X, Y, or Z was dropped.

Any other field with a value of X, Y, or Z was set to null.

- Any Elevation with a -9999, -9998, or -9997 was set to null.
- Any FRN generated during processing (those starting with 00000000__) were converted to a value of 9999.
- In the Blocks and Roads tables there are new fields called Reseller. Because only data from actual providers was accepted, this field was set to 'No' for all records.
- Block geometry was converted from hybrid geometry back to 2000 Census geometry.

3.3 NTIA Data Model Changes Submission 3

The data model released on January 13, 2011 contained the following changes to the submission 2 data model:

- A new field was added to several feature classes called Provider Type
    - Provider Type is "Short Integer" and has domain values of 1, 2, or 3 (1= Broadband Provider, 2=Reseller, 3=other)
    - Most providers are calculated to be "1" (Broadband Provider). In some cases (e.g. Public Utility Districts), providers are considered "Other" (value = 3).
- In the CAI feature class, the field BBService was modified:
    - In S2 if the information was not known, the field was left blank (null)
    - In S3, if we do not have the information, Null values must be changed to code U (for Unknown) – nulls will not be allowed.
- Three new fields have been added to the CAI feature class. Wherever possible, these values have been populated in the CAI data.
    - PublicWifi (Y, N or U)
    - URL
    - CAIID

3.4 NTIA Data Model Changes Submission 4

The data model released on June 30, 2011 and it contained the following changes to the submission 3 data model:

The Category of End user field was added back in to the block and road tables.

- In addition the domain values were changed. 1 still represents residential, but a 2 now represents all non-residential uses.
    - This field was not required, and for many providers, was left blank since the data were not provided.

3.5 NTIA Data Model Changes Submission 5 & 6

No changes were made to the data model for submissions 5 and 6.
The latest data model released was released on August 8, 2012 was very similar to the previous data model. No substantive changes were noted and changes related to allowable speed and technology of transmission combinations. Most of these combinations have exceptions to them and hence were not being completely disallowed by NTIA.

4 UNIVERSE OF CONTACTED PROVIDERS/NON-PROVIDERS

According to both our research and lists provided to use by NTIA, there was the potential for Georgia to have up to 204 broadband providers.
Of these:

- 34 companies stated that they do not provide any type of broadband service in Georgia. Many of these are either national carriers without a Georgia presence, or they file 477 reports because they provide VOIP or Video Teleconference services (but not broadband).
- 40 company names turned out to be a DBA or legal holding names for another firm that is listed in another category. So these duplicates were dropped from our list.
- Eight companies are resellers and are not considered part of this program.
- 36 companies may be broadband providers, but either they indicated they are not willing to provide data, or were completely unresponsive to multiple attempts at contacting them.
- 37 broadband providers informed us that there were no changes to their service area so for these providers we downloaded the data that had been submitted as part of the last submission, reprocessed the data, performed validation on it, and we are resubmitting this data:
- 47 Broadband providers submitted either entirely new or partially new datasets for this submission:

4.1 Non-providers

34 companies stated that they do not provide any type of broadband service in Georgia. Many of these are either national carriers without a Georgia presence, or they are out of business or have been purchased by other companies or they file 477 reports because they provide VOIP or Video Teleconference services (but not broadband).

1. 360 Networks

2. Airespring, Inc.
3. American Fiber Network, Inc.
4. Bellsouth Long Distance, Inc.
5. Bluebird Wireless Broadband Services, LLC
6. Broadcore, Inc.
7. BroadRiver, Inc. & BroadRiver Communications Corp
8. BullsEye Telecom, Inc.
9. Cbeyond Communications, LLC
10. CIMCO Communications, Inc.
11. City of Manchester
12. City of Milledgeville
13. Coastal Broadband
14. Convergence Technologies, Inc.
15. EagleNet
16. Enventis Telecom Inc.
17. eVolve Business Solutions LLC
18. Harbor Communications
19. Light Tower Fiber Long Island LLC
20. LightEdge Solutions, Inc.
21. Lintel, Inc.
22. MainStreet Broadband
23. Netlogic, Inc.
24. Qwest Communications International, Inc.
25. Reliance Globalcom Services, Inc.
26. RGW Communications, Inc.

- 27. Shentel Converged Services, Inc.
- 28. SkyWay USA
- 29. Suburban Cable Inc.
- 30. Telefonica USA, Inc.
- 31. Telovations, Inc.
- 32. University Corporation for Advanced Internet Dev
- 33. Wandering WiFi
- 34. Windjammer Communications LLC

4.2 Shell Companies

The following 40 company names turned out to be a DBA or legal holding names for another firm that is listed in another category. These duplicates were dropped from our list.

1. Accucom Telecommunications
2. AGL Networks , LLC
3. Airimba and Windchannel Communications
4. ATC Broadband LLC
5. Birch Telecom, inc.
6. Blue Ridge Telephone Company
7. Board of Water, Light & Sinking Fund Commissioners
8. Broadwing Communications, LLC
9. Business Telecom, Inc.

10. Camden Telephone & Telegraph Co., Inc.
11. Cellco Partnership
12. City of Monroe
13. City of Tifton
14. ComSouth Telenet, Inc.
15. Covad Communications Company
16. Depot Street Communications, Inc.
17. DoveTel Communications, LLC
18. DSLnet Communications, LLC
19. Dycom Holding, Inc.
20. ETC Communications, LLC
21. Flint Cable TV, Inc.
22. GEORGIA RSA # 8 PARTNERSHIP Limited Partnership
23. Habersham Electric Membership Corporation
24. ITC Globe, Inc.
25. James Cable LLC
26. KLiP, LLC
27. Madison River Communications, LLC

28. MediaStream

29. Nelson-Ball Ground Telephone Company

30. New Cingular Wireless Services, Inc.

31. Northland Cable Properties Seven Limited Partnership

32. Northland Cable Properties, Inc.

33. Northland Cable Television, Inc.

34. NuVox Communications, Inc.

35. Plant Tifnet

36. Quincy Telephone Company

37. US LEC of Georgia Inc.

38. Valley Cable TV, Inc.

39. ViaSat Inc.

40. Wideopenwest

41. WilTel Communications, LLC

4.3 Resellers

The following 8 companies are resellers and are not considered part of this program.

1. Broadview Networks, Inc.

2. Global Crossing North American Networks, Inc.

3. Greenfly Networks, Inc.

4. Metropolitan Telecommunications of Georgia, Inc.

5. New Edge

6. Reallinx, Inc.

7. Smart Choice Communications, LLC

8. Wholesale Carrier Services

4.4 Non-Participating or Non-Responsive Providers

36 companies may be broadband providers, but either they indicated they are not willing to provide data, or were completely unresponsive to multiple attempts to contact them.

1. airBand Communications, Inc.

2. Albany, Water, Gas and Light Commission

3. American Fiber Systems, Inc.

4. American Telephone Company LLC

5. Birch Communications, Inc.

6. Brightlan LLC

7. Broadstar, LLC d/b/a PrimeCast

8. City of Augusta

9. City of Cartersville

10. City of Statesboro

11. CONEXIZ Corporation

12. Digital Agent, LLC

13. DirectPath

14. Electric Power Board

15. EnerSphere Communications LLC

16. FPL FiberNet LLC

17. Georgia Business Net

18. Georgia Public Web, Inc.

19. Gosuto Wireless Internet

20. HCE Media, LLC / Ridge Networks

21. Interglobe Communications, Inc.

22. Kennedy Cablevision Inc.

23. Net2Atlanta

24. Netlink IP Communications

25. One Ring Networks

26. Parker Fibernet

27. Reynolds Cable TV Inc.

28. Smartresort Co., LLC d/b/a/ Beyond Communications

29. South GA Governmental Services Authority

30. Stratos Offshore Services Company

31. Sunesys

32. SyncGlobal

33. The Seimitsu Corporation

34. VectorLink

35. Verizon Communications d/b/a Verizon Business
    Glob

36. Wireless Hometown LLC

4.5 Providers with No Data Updates

37 broadband providers informed us that there were no changes to their service area so for these providers we downloaded the data that had been submitted as part of the last submission, reprocessed the data (to remove water only polygons and to reprocess for the different methodology for 2 sq mile calculation), performed validation on it, and we are resubmitting their data:

1. AL-GA Wireless Broadband, LLC

2. Alltel/ Allied Wireless Communications Corp

3. ATG Communications, LLC

4. Brantley Telephone Company, Inc.

5. Bulldog Cable Georgia

6. Bulloch Telephone Cooperative
7. Cavalier Telephone LLC or Talk America
8. Chickamauga Telephone Corporation
9. City of Cairo, GA
10. City of Camilla d/b/a South Georgia Gov't Svcs.
11. City of Dublin
12. City of LaGrange
13. City of Moultrie
14. City of Thomasville Utilities
15. ComSouth
16. Fort Valley Utility Commission
17. Glenwood Telephone Company
18. Hargray of Georgia, Inc.
19. Kings Bay Communications, Inc.
20. KitePilot Wireless Internet
21. MonroeAccess.net
22. Nextlink Wireless, Inc.
23. NuLink Digital

24. Pembroke Telephone Company, Inc.

25. Plant Telephone Company

26. Plantation Cablevision, Inc.

27. Progressive Rural Telephone Co-op., Inc.

28. Quitman Wireless

29. Skycasters

30. South Georgia Regional Information Technology Auth

31. Southeastern Services, Inc.

32. StarBand Communications, Inc.

33. Viasat/WildBlue Communications, Inc.

34. Wave2Wave Communications, Inc. & RNK

35. Wilkes Telephone & Electric Company

36. XO Communications, LLC

4.6 Providers with Data Updates

A total of 47 Broadband providers submitted either entirely new or partially new datasets for this submission:

1. Al-CAll, Inc./ATC

2. Appalachian Valley Fiber Network

3. AT&T of Georgia

4. AT&T Wireless
5. Bright House Networks Information Services
6. CenturyLink/CenturyTel
7. Charter Communications
8. Citizens Telephone Company, Inc.
9. Clearwire
10. Cogent Communications Group
11. Comcast Corporation
12. Cox Communications, Inc.
13. Cricket Comm/Leap Wireless International, Inc.
14. Dalton Utilities
15. Darien Telephone Co., Inc.
16. DeltaCom, Inc./EarthLink Business
17. ELBERTON , City of
18. Ellijay Telephone Company
19. Fairpoint/GTC, Inc.
20. FiberLight, LLC
21. Frontier Communications of Georgia, Inc.

22. Hart Telephone Company

23. Hughes Communications/HNS License Sub, LLC

24. iWispr LLC

25. JamesCable (Waycross Cable) d/b/a MediaStream

26. Knology, Inc.

27. Level 3 Communications, LLC

28. Mediacom Communications Corp & MCC Georgia LLC

29. MegaPath

30. MetroPCS Georgia, LLC

31. North Georgia Network Cooperative, Inc.

32. Northland Cable Properties Eight Limited Partnership

33. Pineland Telephone Cooperative, Inc.

34. Planters Rural Telephone Cooperative, Inc.

35. Public Service Data Wireless

36. Public Service Telephone Company/Flint Cable

37. Ringgold Telephone Company

38. Sprint Nextel Corporation

39. TDS Telecomm

40. T-Mobile

41. Trenton Telephone Company

42. TruVista

43. TW Telecom of Georgia L.P.

44. Unite Private Networks, LLC

45. Verizon Wireless

46. Waverly Hall Telephone, LLC

47. Windstream Georgia Telephone

Guam Broadband Mapping Project: Product Release White Paper

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Product Specification:	April 2013 NTIA Data Model
Product/Process:	NTIA—April 1, 2013 Data Deliverable
Dataset Submission QC:	NTIA—SBDD_CheckSubmission.py

Table of Contents

OVERVIEW

This white paper highlights the **Submission Summary** for this deliverable, as well as describes the **Data Gathering**, **Data Integration**, **Data Validation and Verification** and **Quality Control** processes used to create the Broadband Mapping Project's April 1st, 2013 data submission. To support varying levels of technical and program knowledge, both a **high-level summary** and a **detailed process review** are supplied.

SUBMISSION SUMMARY

PROVIDER DETAILS

PROVIDER PARTICIPATION

- Providers Included
  - Docomo Pacific
  - GTA
  - IT&E
  - MCV
  - PDS (Pacific Data Systems) Guam

- New Providers Since Last Data Submission
  - None

COMMUNITY ANCHOR INSTITUION (CAI) DETIALS

OVERALL STATISTICS

Community Anchor Institution - Categories	Overall Count	CAIID Counts	Transmission Technology	Advertised Speed Down	Advertised Speed Up
Category 1 - School K through 12	56	38	0	0	0
Category 2 - Library	9	6	5	5	5
Category 3 - Medical/Healthcare	8	0	6	6	6
Category 4 - Public Safety	28	0	19	19	19
Category 5 - Universities/Colleges	5	3	0	0	0
Category 6 - Other: Government	80	0	0	0	0
Category 7 - Other: Non-Government	68	0	0	0	0
Total	**254**	**47**	**30**	**30**	**30**

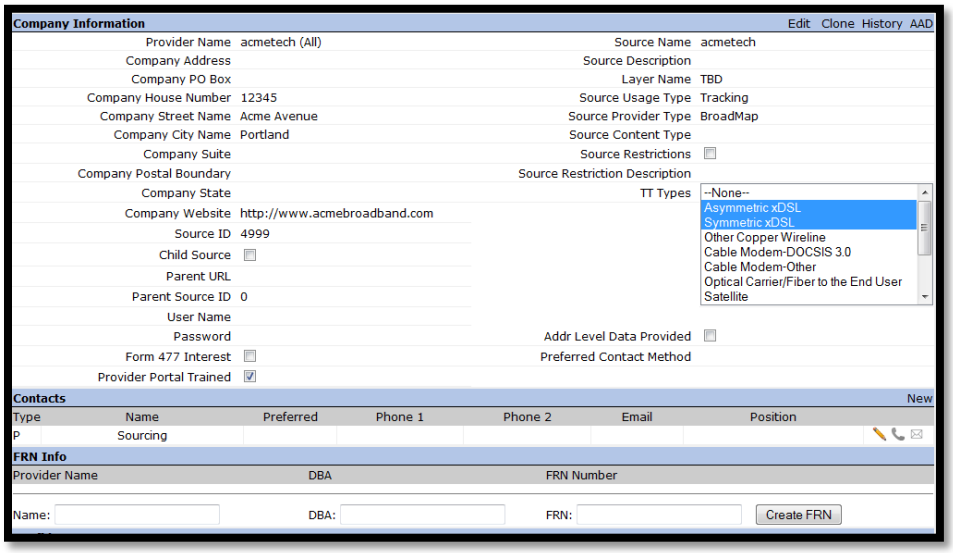
HIGH-LEVEL SUMMARY

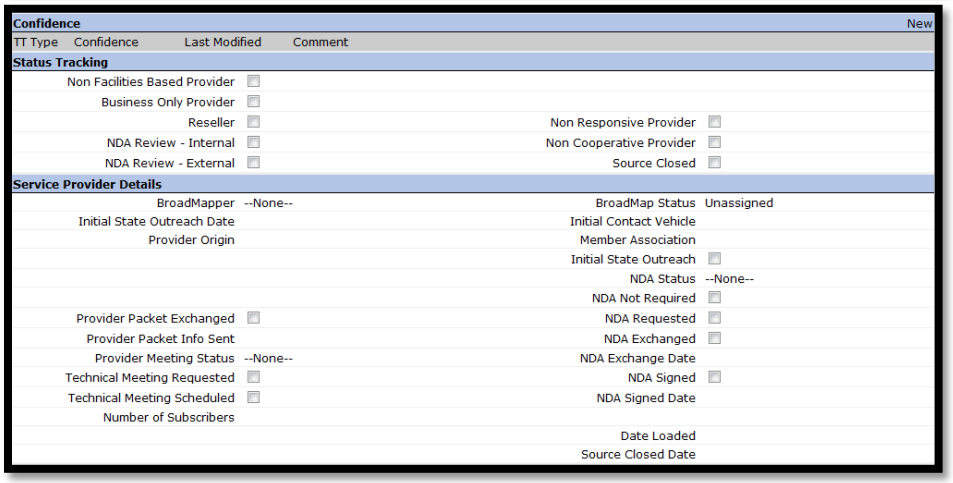
DATA GATHERING

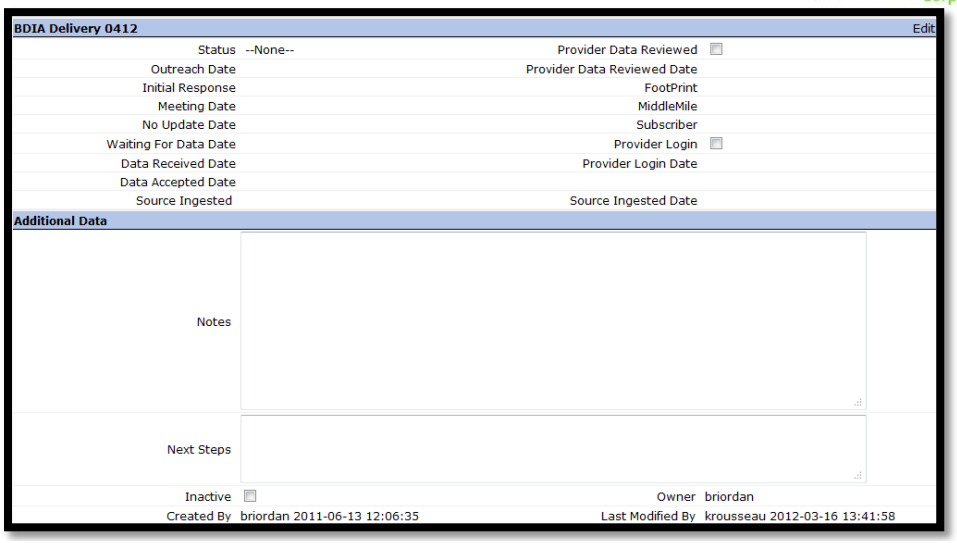
BROADBAND SERVICE AREAS, MIDDLE MILE AGGREGATION POINTS AND BROADBAND SERVICE OVERVIEW

The collection of Broadband Service Areas, Middle Mile Aggregation Points and Broadband Service Overview information is handled through the following Provider Outreach Process:

- Build and maintain an inventory of Broadband providers through research and State inputs.
- The inventory and everyday interaction with providers is tracked using our Provider Catalog (PCat). Below are some examples of the web application, which has a shared access between our team and mapping partner (BroadMap).







- In order to encourage participation throughout the life of the program, we feel it's important to foster relationships with the providers and encourage a collaborative team effort between all parties for each data submission.

- Update provider material that describes the data requirements and logistics for data transfer.
- Update Non-Disclosure Agreement (NDA) for use in project, where applicable.
- Maintain multiple protocols for the provider to submit data, including Secure File Transfer Protocol (SFTP) technology when desired.
- Conduct one-on-one informational discussions with each provider to communicate the following:
  - Requirements of this project;
  - Broadband data required to support the product data model;
  - Submission protocols available;
  - Capability to validate how the supplied data is aggregated.
- Download/receive provider data.
- Establish a repeatable process with provider. Maintain provider communication, transaction and data handling records throughout the project (dates contacted, data received, etc.).

COMMUNITY ANCHOR INSTITUTION (CAI)

The collection of CAI information is handled through the following CAI Collection Process:

- Collect and maintain inventory of CAIs through data mining, research and State inputs.
- Maintain web-based CAI portal for institutions to add or confirm attribution, location and enter broadband-specific information.
- Upload web-based data to Core Database for standardization.
- Perform internal cleansing, such as removing duplicate records, identifying gaps in broadband attribution and verifying category.
- Geocode CAI locations.
- Translate Core Database data to deliverable-ready format.
- Continue engagement with non-responsive institutions.

DATA INTEGRATION PROCESS

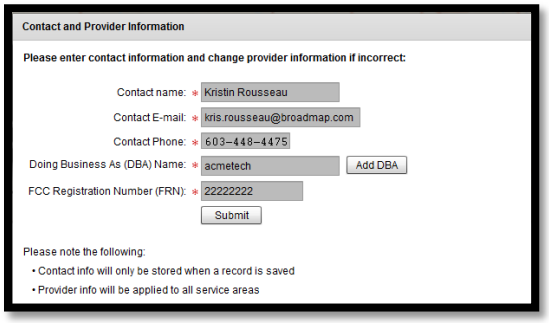
The data integration and processing mechanisms currently used allow for multiple types of inputs and result in a standardized output that meets the NTIA deliverable requirements. This flexible process supports data model changes and project-requested enhancements.

- Receive inputs from providers via submission protocols; upload into Sourcing Database and catalog with provider information.
- Review provider-supplied data for completeness and for potential discrepancies that require resolution prior to processing and flag as necessary.
- Categorize input into data-type category (addresses, block lists, paper maps, etc.).
- Standardize input based on data type within Staging Database.
- Create Compact Polygons (CP)—(internal methodology for generating area-based feature for coverage in Staging Database).
- Apply broadband attribution to CP; apply metadata to CP.
- Perform quality analysis of the CP against the source supplied to identify any completeness or accuracy issues.
- Request additional information from the provider if elements of coverage are missing or contain discrepancies. This is a second manual quality check to ensure data is complete.
    - Process coverage area to build the required NTIA data model layers.

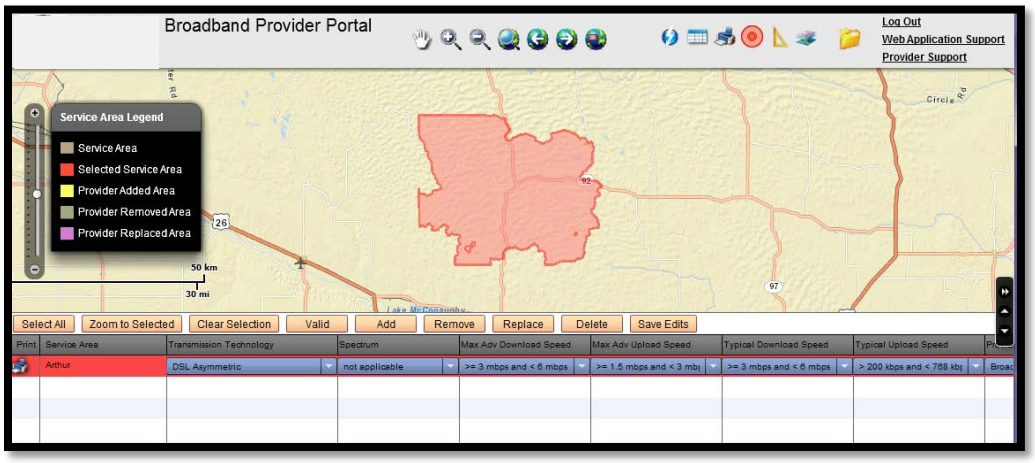
With the deployment of the Provider Portal this round, the data collection and later validation process was streamlined allowing both activities to occur within a secure web application. The majority of the providers used this methodology as it's allows them more visibility into how their data is being represented and gives them knowledge and ownership of their coverage representation. Below are some bullet points and supporting screen shots on how the portal is used.

- Each provider is assigned credentials with a strong password to ensure security measures are taken into consideration

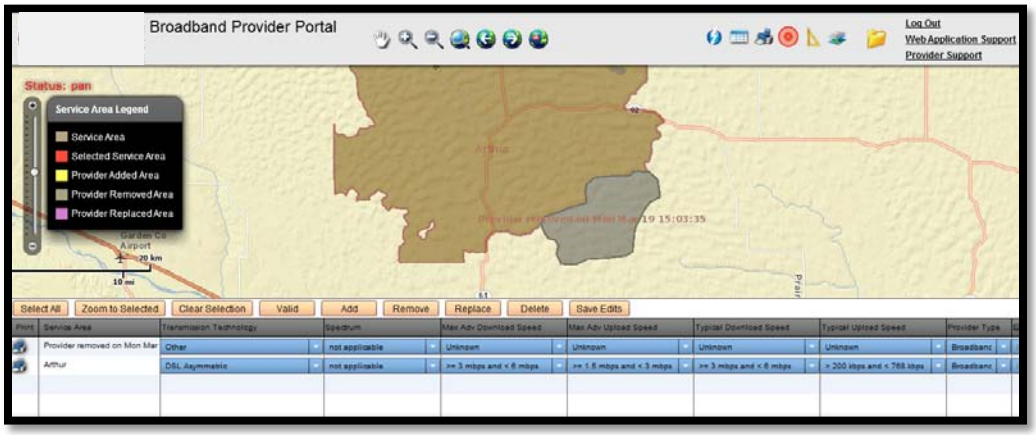
- Collection and confirmation our contact, as well as the company's DBA Name and FRN accuracy



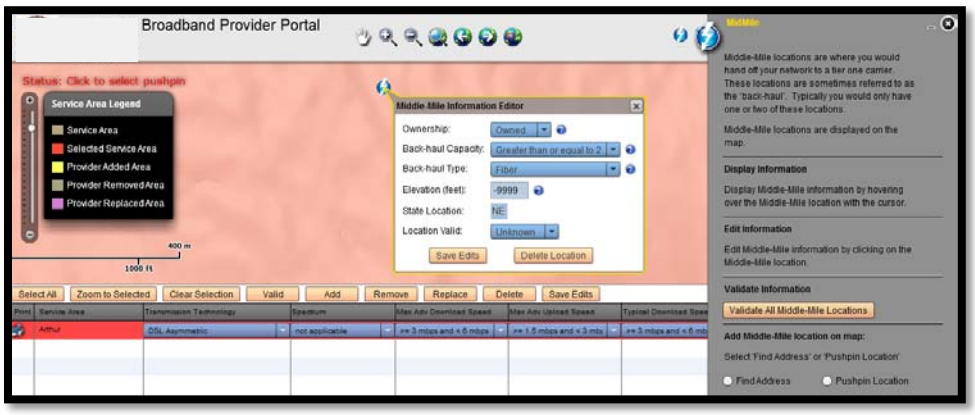
- Capability to review and request changes to the coverage footprint

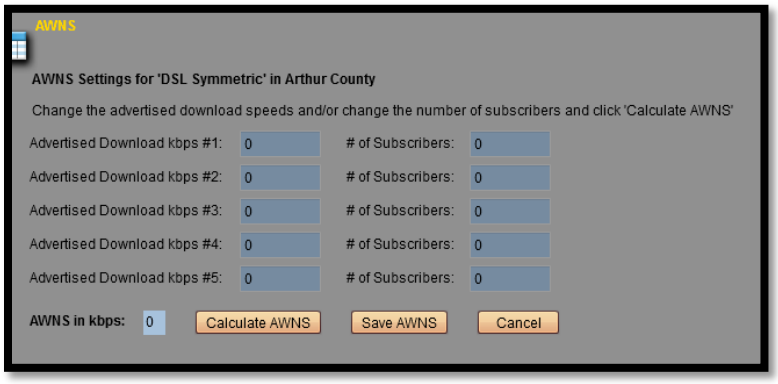


- The provider can Add/Remove portions, or all, of the footprint requesting that their footprint be increased or refined.

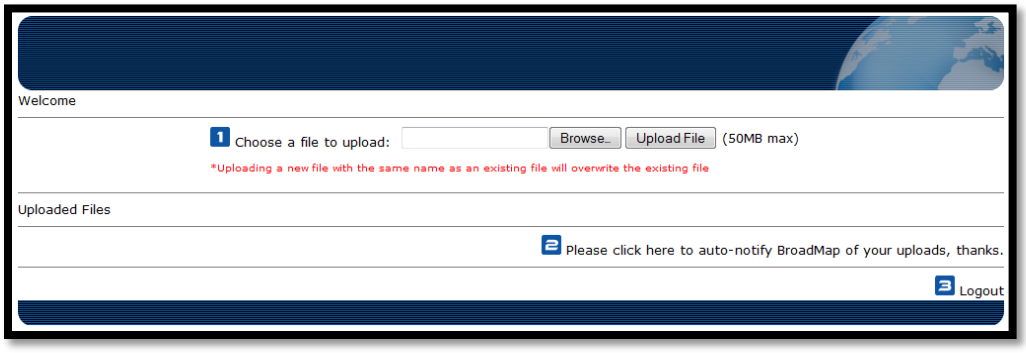


- Middle Mile and Average Weight Nominal Speed (AWNS) collection and validation





- File upload functionality to support providers that would prefer a shapefile, spreadsheet, PDF, KMZ/KML file be used to reflect changes for the data round



- Once the provider has review completed changes to their coverage, middle mile and AWNS, then can validate them all signing off that everything is accurate.

DATA VALIDATION AND VERIFICATION

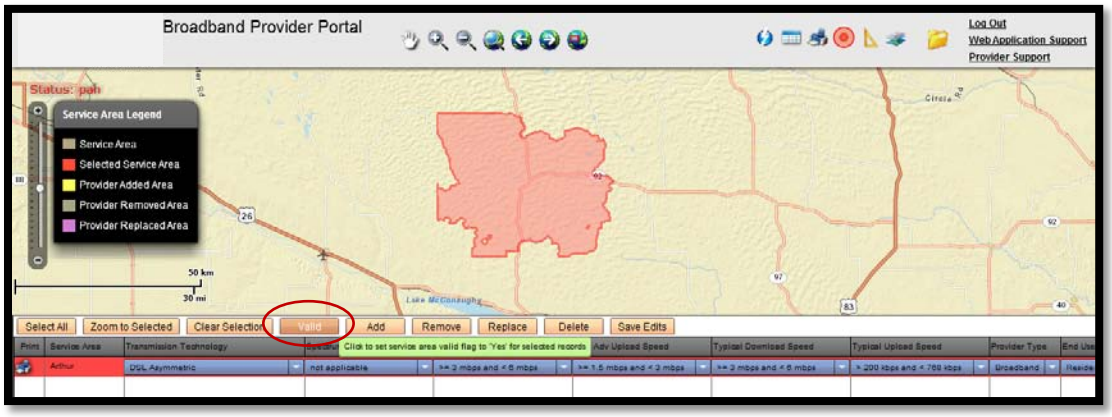
Following the creation of the product, process steps within Data Validation and Verification occur. To ensure the data collected and processed is as accurate and comprehensive as possible, provider validation and internal verification activities are employed. After the initial mapping of providers' coverage areas and serviceability claims, additional reviews are performed using the methods described in the subsections below in order of action (**Broadband Provider Validation**, **Third-Party Data Verification**, **Public Verification, and Confidence Values**).

BROADBAND PROVIDER VALIDATION—PROVIDER PORTAL APPLICATION

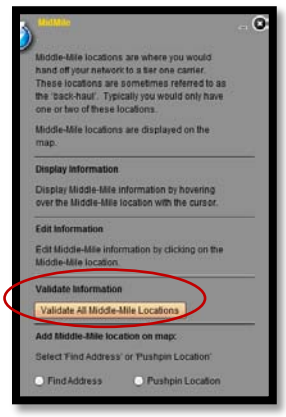
Providers are trained on and requested to use a secure interactive web application to review their current coverage area(s) and supporting broadband attribution and validate their data or submit change requests to update their data. All provider change requests go through the **Data Integration Process** and are reviewed with the provider to complete validation.

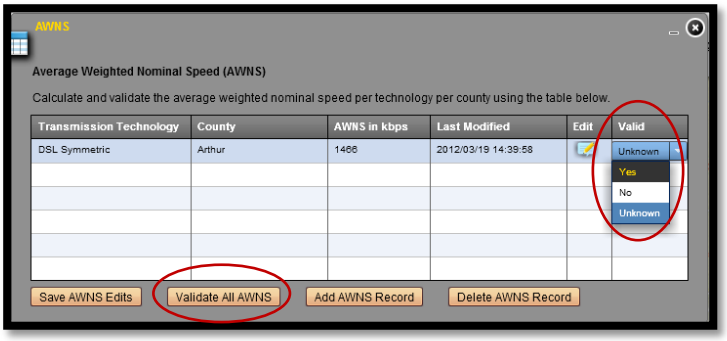
With the latest released of the Provider Portal, validation on the coverage area, middle mile and average could be completed individually. Validation examples are as follows:

- Coverage validation can be done on one record/footprint at a time or by selecting footprints and selecting the 'Valid' button. The provider could also print off their coverage for their own tracking purposes.



- Middle Mile & AWNS Validation





All validation results are tracked internally through our Validation Table, which also improves the overall **Confidence Value** as mentioned below.

THIRD-PARTY DATA VERIFICATION

For this submission, the NTIA 3rd Party Data summary was reviewed again to ensure any corrections required were represented in the final product and the supporting documentation. This includes additional feedback received directly from NTIA, prior to this data submission.

This submission was also compared to the previous data submission, October 2012, as a quality check to identify and resolve any potential erroneous discrepancies between the two products.

PUBLIC VERIFICATION

The broadband interactive map has been released to the public, which includes functionality to collect feedback on the provider's coverage areas, as well as running a speed test. The feedback and speed results are collected and reviewed with the providers prior to the next data submissions to identify if any map refinement is required.

The public website can be viewed at the following hyperlink:

http://gubb.broadmap.com/PublicMap/

CONFIDENCE VALUES

All verification, validation and manual quality review results are tracked by provider/technology type and stored and maintained within a **Validation table**. A confidence value is assigned, based on internal assessments of the collected information, to highlight the provider coverage areas and/or attributions that would benefit from further investigation and/or enhancements.

With the continued efforts on provider validation, 3rd party verification and the release of the public interactive map with feedback collection functionality, the confidence values will continue to be utilized further to identify specific areas in need of attention.

QUALITY CONTROL

Following collection, processing and analysis of the provider and CAI data, the product is checked manually and algorithmically against the NTIA data model. Some of the items included within these checks are:

- Format correctness;
- Table and field structure;
- Valid values, including default values, where applicable;
- Geographic extent and topology errors.

Prior to data submission, another quality control script supplied by NTIA is run. This script, SBDD_CheckSubmission.py, creates an output in text form that is required to be submitted along with the final deliverable. All errors must come up clean, unless otherwise specified by NTIA.

DETAILED PROCESS REVIEW

To review the detailed process, please review the attached object:

BMap_ProcessDetails_2013_04_01.docx

Methodology Guidance

The white paper should:

1. Effectively describe the deliverable data;
2. Effectively describe the data collection process;
3. Effectively describe the verification process.

1. Data Description Provide a general description / summary of data submission including file names and a brief description of each dataset.

Contents of the data submission folder:

1. Data Transfer Model (HI_SBDD_2013_04_01.gdb)

Description: This data submission follows FCC/NTIA guidelines including Metadata for the project. The SBDD File Geodatabase contains the following layers:

BB_Service_Address	464 Records
BB_Service_Road_Segment	5,989 Records
BB_Service_CensusBlock	16,178 Records
BB_Service_CAInstitutions	1,306 Records
BB_Service_Wireless	17 Records
BB_Service_Overview	0 Records
BB_ConnectionPoint_LastMile	119 Records
BB_ConnectionPoint_MiddleMile	1 Records

2. Data Package Report (HI_DataPackage_2013_04_01.xlsx)

Description: This is the NTIA “datapackage.xls” spreadsheet that is used to document the data submission.

3. Data Submission Receipt (HI_2013_04_01.txt)

Description: This is the submission receipt from the NTIA receipt tool.

4. Methodology Paper (HI_Methodology_2013_04_01.pdf)

Description: This is the methodology guidance document requested by NTIA to document the data submission. Page 1 of 6 (this document)

5. ReadMe.txt (HI_ReadMe_2013_04_01.pdf)

Description: This is the ReadMe that contains the explanation of any failures or warnings that we received in running the submission script.

6. Changes and Corrections (HI_Changes_and_Corrections_2013_04_01.pdf)

Description: This is the NTIA "Changes and Corrections" document that is used to describe the changes and corrections to the data submission.

2. Provider Participation Provide a summary of provider cooperation (datapackage.xls).

The project team has been collecting and processing broadband data from twelve (12) providers (Oceanic Time Warner Cable, Hawaiian Telcom Communications, Inc., Clearwire Corp.,TW Telecom Holdings, Inc., Verizon Communications, Inc., Sprint Nextel, AT&T Inc., MOBI PCS, T-Mobile USA, Inc., Sandwich Isles Communications, Inc., BlueStreak Broadband, Inc. and Skycaster). These twelve (12) providers account for the overwhelming majority of actual broadband subscribers in Hawaii. The project team has identified 3 additional providers which would bring the total providers to 15. The following providers have been identified as:
-Pacific Light Net, Inc. dba/Wavecom Solutions, which has now merged with Hawaiian Telcom, VIASAT dba/ Big Island Satellite, and Starband but the team has not yet received from these providers.

Hawaii Department of Commerce and Consumer Affairs ("DCCA") has encountered challenges in fully executing NDAs with providers and subcontracts under the grant. This has affected the signing of certain NDAs with data providers as well as subcontracts dealing with data processing and delivery. Subsequently, throughout this term, DCCA has experienced some delays in obtaining necessary information. However, to-date DCCA has been able to process data representing the overwhelming majority of broadband providers in the State of Hawaii. – DCCA continues to overcome these challenges through cooperation between the parties and improving process expediency. Eleven (11) of the twelve (12) Providers identified have executed confidentiality agreements for data sharing.

Hawaiian Telcom Communications, Inc. and Oceanic Time Warner Cable: Last-mile and middle-mile facility capacity and more specifically backhaul from the facilities are deemed proprietary. Further, providers maintain that they do not have information documented in a form that they would be able to easily provide. No information regarding this has been shared to-date by these providers. DCCA is working to compel these Providers to furnish more detailed information.

In December of 2012, Hawaiian Telcom, Inc. completed the acquisition of all of the capital stock of Wavecom Solutions Corporation (Wavecom Solutions), an information and communications technology company and facilities-based competitive local exchange carrier headquartered in Honolulu. Wavecom Solutions provides voice, data and converged services to small and medium-sized business and carrier customers through a six-island subsea and terrestrial fiber network. They provided no new data concerning this merger.

Sandwich Isles Communications, Inc., BlueStreak Broadband, Inc., MOBI PCS did not provide new data updates for the Fall 2012 data delivery. However, BlueStreak Broadband, Inc. verified the existing coverage was accurate and there was no need for Spring 2013 data updates. MOBI PCS's broadband information has not changed and likely will not until their deployment of 4G services later in 2013. Three satellites broadband providers were identify but only one provider, Skycaster, provided data. Additional data obtained via provider websites are as follows:

- Hughes (aka Hughes Net) - is not offered in Hawaii.

- VIASAT -does offer broadband through a local company called "Big Island Satellite". They offer service for Maui County (Maui, Lanai, and Molokai) and Oahu. Their maximum advertised speeds are up to 12Mbps Downstream/3Mbps Upstream. Most of their business is in Hawaii County.
- StarBand –advertises 0.5Mbps to 1Mbps Downstream and 0.07Mbps to 0.256Mbps Upstream. They have declared that they cover all Hawaii Islands.
- Skycaster has declared that they cover all of Hawaii. Their data has been included in this submission.

The project team continues to verify these coverage areas and broadband speed claims as well as to collect data from other providers as they are identified.

The most recent iteration of updated and verified mapping data was submitted to NTIA on October 1, 2012 in accordance with the latest FCC/NTIA broadband data model.

3. Data Collection and Integration

a. Primary Data Collection describes the data collection process and list any surveys distributed to retrieve data.

Data was obtained by working with Providers (phone conference calls and email) to get the latest information at the most detailed level possible. The team furnished Providers with a data request including the latest table specifications via email that included the specific information needed for the project. All other terrestrial broadband Providers maintained census block level detail. Wireless providers submitted RF propagation polygons illustrating coverage.

Broadband coverage data for Hawaiian Telcom Communications has been extrapolated as a one-mile buffer from each Central Office location. For every other provider, the DCCA has obtained census block level information and coverage footprints from the wireless providers. Since the data is being provided at the census block level or via a coverage footprint from wireless providers, exact levels of service provided within these boundaries in some cases has been limited to a single tier of service per census block or wireless footprint. TW Telecom has furnished customer addresses which have been geocoded and inserted into the FCC file geodatabase model as appropriate. We have received information from the public via the hibroadbandmap.org website, stating that fiber to the premise existed for Hawaiian Telcom Communications, Inc. at a few addresses which were verified with the provider and added to the database.

A very small amount of address level detail from Providers has been submitted for this data submission. For wireless providers, the project team is requesting more detailed RF propagation maps, tower locations, and greater detail on wireless service coverage and technology. Further, the project team will be analyzing and adjusting existing census block data to fit within Tax Map Key (TMK) boundaries in an effort to increase the accuracy of the stated data coverage areas for use on the State's broadband website and for planning purposes.

b. Community Anchor Institutions Summarize Community Anchor Institutions by type, describe your data collection process, and list any surveys distributed to retrieve data.

The baseline Community Anchor Institutions database has been amended, updated and verified. The Community Anchor Institutions database is composed of 1,306 points that include:

Schools – K through 12 (public and private)	367
Libraries	56
Medical/Healthcare	212
Public Safety	95
Universities, Colleges, other Post-Secondary (public and private)	44
Other Community Support – Nongovernmental (Hotels, Resorts, Other)	532

The data was collected from various State databases (i.e. Schools, Libraries, Public Safety), and from InfoUSA data downloads. Data was verified by personal telephone calls and information collected from websites. No surveys were distributed. The project team plans to include restaurant lounges, malls and coffee shops with advertised free Wi-Fi in the next deliverable, as well as, continue with telephone verification to obtain more information from CAI's.

For this data submission we included private businesses providing free Wi-Fi services for their customers (Nongovernmental).

4. Validation

a. Overview Provide a general summary of the validation process and methodology used.

See below.

b. Business Logic Rules Define the business logic related to data validation including a clear structure or methodology used.

Data Excluded by Business Rules (Organized by layer)

Broadband_Service_CensusBlock - Total Excluded: 10,657 Census Blocks

- Excluded by Business Rule
  - The block must contain population
    - 3,433 Census Blocks – Hawaiian Telecom
    - 5,823 Census Blocks (0 populations) – Oceanic Time Warner Cable
    - 414 Census Blocks – TW Telecom
    - 984 Census Blocks – Sandwich Isles Communications
  - Combination business rule for transmission technology speed combinations
    - 3 Census Blocks – TW Telecom

Broadband_Service_RoadSegment - Total Excluded: 889 Segments

- Excluded by Business Rule
  - The block must contain population
    - 734 Segments – Hawaiian Telecom
    - 47 Segments – Sandwich Isles Communications
    - 108 Segments (0 populations) – Oceanic Time Warner Cable

c. Feedback Loop Describe any outreach to Broadband Providers after you processed their data.

We are working with providers on an ongoing basis to rectify data including the provision of coverage maps.

d. Statistical Models List and describe any statistical models used to compile and analyze the data.

None used to date.

e. 3rd Party Publicly Available Data identify all 3rd party datasets used and describe how they were used to validate the data. (3rd party datasets include American Roamer, Form 477, Form 325, etc.

- Info USA used for address validation of CAI's.
- Used updated Hawaiian Homelands boundaries.

f. Crowd Sourced Data Identify whether or not crowd sourced data was used and how the data was used for validation.

Hawaii broadband website Ookla tools are being collected on a monthly basis. The State's Broadband Speed Test (http://hawaiispeedtest.net) has been advertised and has experienced over 25,000 tests taken. The data is being analyzed to determine actual speeds versus provider stated speeds. Also, we have received email reports of unserved areas from residents using the http://www.hibroadbandmap.org website.

The project team is implementing the following verification activities:

- Coverage Verification via Website: DCCA launched a dedicated website (hibroadbandmap.org) that contains the latest information on the project as well as a speed and line test application and database for consumers to use. Additionally, consumers are able to report unserved areas on the website. – Completed December 1, 2010
- CAI Verification by Telephone: DCCA will independently verify access to broadband services by Community Anchor Institutions ("CAI") where no data currently exists via personal contact by telephone. – Ongoing
- CAI Verification by External Data Source Comparison: The project team will be collecting data from InfoUSA to verify the completeness of the CAI inventory. – Ongoing
- Provider Verification via Map Products: DCCA will present the data to the individual providers in the form of a map product, ask them to verify the results visually, and, if necessary, ask them to provide more accurate information if available. – Ongoing

- Speed Test Verification via Website: DCCA will announce the speed and line test application and website for consumers via press releases and newspaper articles to encourage subscriber participation. The database will be maintained throughout the course of the project. – Completed January 25, 2012 and Ongoing

- Speed Test Verification via FCC Ookla/MLabs: FCC databases are being collected on a monthly basis and integrated into a coverage verification layer that will also appear on the website. – Ongoing

- Provider Verification via Website: Providers will also be able to access the maps of their data through a secure portal on the website. – Ongoing

The project team's status on implementing the following verification activities:

- Coverage Verification via Website: The dedicated website (hibroadbandmap.org) was launched on December 1, 2010 and includes a customized Ookla speed test application and database for consumers to use, as well as, ESRI's BBStat application. – In Progress.

- CAI Verification by Telephone: DCCA has and will continue to verify Community Anchor Institution data via telephone. – In Progress.

- CAI Verification by External Data Source Comparison: InfoUSA data is being downloaded to augment and verify the completeness of the CAI inventory. – In Progress.

- Provider Verification via Map Products: Maps that illustrate coverage gaps are being prepared for provider review. – In Progress.

- Speed Test Verification via Website: The dedicated website (hibroadbandmap.org) launched on December 1, 2010 includes a customized Ookla speed test application and database for consumers to use, as well as, ESRI's BBStat application.– In Progress.

- Speed Test Verification via FCC Ookla/MLabs: FCC speed test data is also being integrated into an independent map layer. – In Progress.

- Provider Verification via Website: Providers will also be able to access the maps of their data through a secure portal on the website. – In Progress.

Note: These verification activities and direct updates from providers are anticipated to continue through the next data delivery date.

In addition, the project team is participating in a program sponsored by Akaku: Maui Community Television on Broadband. Our website Hibroadbandmap.org will be listed on their site and they will be requiring all students to perform daily speed tests using our Site to test as well as theirs. The team will be talking about broadband, the national and state programs and the importance

of speed test accuracy. Phase 1 was complete in Dec 2011, which consisted of broadband mapping team members being interview by Akaku at their studios in Kahului, Hi. Phase 2: TBD

OFFICIAL APRIL 2013 UPDATE SUBMISSION TO THE NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION UNDER THE STATE BROADBAND DATA AND DEVELOPMENT GRANT PROGRAM FOR THE STATE OF IOWA

April 1, 2013

TABLE OF CONTENTS

April 1, 2013

Ms. Anne W. Neville
SBI Grant Program Director
National Telecommunications and Information Administration
U.S. Department of Commerce
Room 4716
1401 Constitution Avenue, NW
Washington, DC 20230

Dear Ms. Neville:

As the State Broadband Designated Entity, in partnership with the Iowa Economic Development Authority, please accept this submission from Connected Nation on behalf of the state of Iowa's State Broadband Initiative (SBI) Grant Program, known as Connect Iowa.

Connected Nation and Connect Iowa congratulate the National Telecommunications and Information Administration (NTIA) and the Federal Communications Commission (FCC) on achieving the two-year anniversary of the National Broadband Map. Truly, now more than ever, the significance of complete and validated data through this effort is impacting lives in communities all across our great country. The Connect Iowa program and its collective stakeholder community continue to be faithful and energized contributors, and we are proud to play such a part in forging the innovation economy of the twenty-first century.

The artifacts that comprise this submission should be found to be compliant with the April 1, 2013, deadline for the semi-annual data update and in accordance with the terms of the July 1, 2009, Notice of Funds Availability (NOFA) and all subsequent clarifications pertaining to delivery of state-level mapping of broadband service availability. This packet includes:

Inventory of Deliverables, Connect Iowa: April 1, 2013

NOFA Requirement	Data Transfer Model	Data Description
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in Census Blocks of No Greater Than Two Square Miles in Area
Appendix A: 1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census Blocks Larger in Area Than Two Square Miles

Appendix A: 1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address
Appendix A: 3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points
Appendix A: 4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing
Appendix A: 4	n/a	Community Anchor Institutions-Narratives
VII.A.1(a)	n/a	Accuracy and Verification Report
n/a	DataPackage.xlsx	Worksheets of Contact Information, Record Count, and Provider Summary Table
n/a	n/a	List of Changes and Corrections to the Dataset
n/a	n/a	Non-Participating Provider (NPP) Narratives
n/a	n/a	Broadband Provider Roster and Participation Status

In addition, this data update submission should be found to be compliant with the additional program requirements instituted by the National Telecommunications and Information Administration since the time of the October 2012 SBI data submission for the Connect Iowa program. Specifically, these new requirements are:

SBI Data Transfer Model
The submission of the broadband dataset for April 1, 2013, is contained within the SBI Data Transfer Model as released on the Grantee Workspace on December 14, 2012. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information on each provider as possible.

Additional Submission Guidance
On February 8, 2013, NTIA released new guidance regarding the processing of wireless data, for both fixed and mobile broadband providers. All wireless provider coverage records have been reviewed and are in compliance with this grantee guidance for this April 2013 submission period. Even providers that did not have an update for this submission cycle were reviewed and data reprocessed as necessary for those records that were not yet in compliance with the new guidance.

This submission continues to follow the speed technology guidance released by the Program Office on August 9, 2012, to review speed tier codes in correspondence with technology of transmission codes. In the October 2012 submission, descriptions were provided in the methodology paper that offered an explanation for any submitted technology of transmission and speed combinations that were outside of the expected value range. That

practice continues in this submission as technology and speed combinations are reviewed and scrutinized; any questionable information supplied by providers is reviewed more in depth with the provider to ensure the information is accurately captured or a proper explanation is provided as to why the speed information should be submitted as supplied even if it falls outside the expected value range.

This submission also includes information regarding the data and coverage estimation of a non-participating provider. While Connect Iowa continues outreach to all providers prior to each submission period, the need to submit broadband service data for all providers regardless of their participation is evident as the SBI program continues into this seventh round of data submissions. The submission of this estimated broadband service area for providers that have not supplied data to Connect Iowa is essential in being able to portray a more accurate depiction of the current broadband landscape.

This April 2013 semi-annual data update under the SBI Grant Program continues to demonstrate our dedication to implementing the joint purposes of the Recovery Act and the Broadband Data Improvement Act (BDIA) by gathering comprehensive and accurate state-level broadband mapping data, developing state-level broadband maps, aiding in the development and maintenance of the National Broadband Map, and undertaking statewide initiatives for broadband planning.

Broadband Service Availability — Provider Outreach and Verification

This data update submission under the SBI program includes datasets for 99.49 percent of the Iowa provider community, or 196 of 197 total providers. There are 195 participating providers and 1 additional non-participating provider whose estimated coverage area has been submitted. Of the 195 participating providers, 75 supplied an update to their network or coverage area(s), while 105 have reported no change. The remaining 15 represent providers who previously supplied data but were non-responsive in the April 2013 update effort; therefore, their previous dataset is being put forward as part of this compilation. A complete roster by provider depicting participation status and contact history is contained herein. The remaining provider that is not represented in the attached datasets was non-responsive to multiple contact attempts.

In addition to the facilities-based and middle-mile broadband providers tracked above, this submission contains datasets for 3 resellers that were able to provide sufficient information on their service area(s) to be included in the data transfer model.

As the aforementioned roster and attached methodology documentation will attest, it is the collective opinion of the Connect Iowa principals that all commercially reasonable efforts were made to account for 100 percent of the known Iowa broadband provider community, pursuant to this semi-annual data update submission.

Connect Iowa has also continued to perform broadband verification activities through several means. In addition to confirmation of service area(s) by each provider, Connect Iowa conducts field validation efforts. To date, 156 (79.20 percent) providers have been validated through field

verification activities. Additional details on verification activities are contained within the Field Validation Methodology.

The Connect Iowa website (www.connectiowa.org) continues to serve a prominent role in the outreach and data collection effort. This program asset provides a way for the general public to participate in the process by offering interactive tools for users to test their connection speed, submit broadband inquiries, or contact a program representative.

As an indicator of stakeholder penetration, the Connect Iowa website encountered 4,799 unique visits during this reporting period (31,230 total to date for the life of the grant awarded on January 1, 2010. Additionally, this pronounced Web activity netted 19 broadband inquiries over this same reporting period (237 grant inception to date). The website also provides access to the My ConnectView™ interactive mapping application, which allows consumers and broadband providers to confirm or dispute the coverage represented on the broadband inventory map. These consumer-initiated actions are facilitated through the Connect Iowa website and the Connect Iowa interactive mapping tool (My ConnectView™) that offer the stakeholders the vehicles to provide information regarding availability in their respective service area, either in affirmation or contest of the reported data represented in the Connect Iowa mapping artifacts. Since the initial data collection and release of corresponding maps, feedback in the form of broadband inquiries has allowed Connect Iowa to identify additional areas that are in need of field validation, which is scheduled as soon as possible.

Community Anchor Institutions

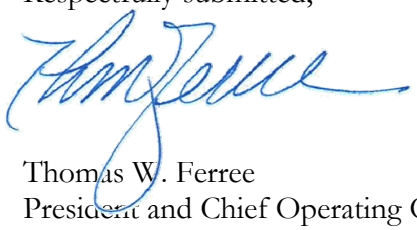
Connect Iowa continues to make significant inroads to gather data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. This uptick in CAI data collection was further supported by NTIA's outreach to grantees reiterating the importance of this outreach. With the continued commitment of the Iowa Economic Development Authority, we have continued to focus on a relationship-oriented approach with state-level agencies and organizations that generates more responses than general contact.

In conjunction with the Iowa Economic Development Authority, outreach was conducted during this data update reporting period by Connect Iowa to continue identification of existing, centralized sources for CAI connectivity data. Additionally, outreach was coordinated to distribute the CAI survey to institutions throughout the state through multiple methods including a customized online survey available on the Connect Iowa website. Building on past success of the September 2012 Education Campaign, February 2013 was recognized as Public Safety Month where the public safety sector was the focus of CAI data collection, research, and public affairs outreach. Connect Iowa has developed a number of new relationships with statewide associations, such as the Education SuperHighway, the Iowa Department of Education, and the Iowa Department of Public Safety, promote the importance of broadband connectivity at anchor institutions and participation in this data collection process. The value of these relationships continues to impact the entire success of the Grant Program, and the CAI engagement is a logical extension of new and existing relationships. Connect Iowa will continue to build upon these new relationships over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

From our work in Iowa, as well as other states, we recognize the great value of this data to future collaboration efforts within the state as well as its value to the National Broadband Map. We plan to continue to bring best practices to the Connect Iowa efforts, along with an investment of both human and technical resources required to reach our goal of increasing the data that is secured and reported as part of this process.

The Connect Iowa program exists to improve data on the deployment and adoption of broadband services and to assist in the extension of broadband technology across all regions of the great state of Iowa, as well as the United States and its territories through contribution to the National Broadband Map. We look forward to the continuing work ahead and improving upon our data collection methods.

Respectfully submitted,



Thomas W. Ferree
President and Chief Operating Officer
Connected Nation, Inc.

IOWA COMMUNITY ANCHOR INSTITUTIONS METHODOLOGY

In this seventh reporting period of the SBI, Connect Iowa, working in close coordination with the state of Iowa, has established an ongoing mechanism for gathering data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. Since the October 2012 data submission, the CAI outreach process method has been modified to improve data collection. Specifically, the outreach process is a more focused sector-specific and relationship-oriented approach that generates more responses than general contact.

Connect Iowa has continued to identify and process CAI data obtained through an ongoing statewide outreach campaign. Physical address information continues to be augmented through manual sourcing and geocoded by Connect Iowa through Esri ArcGIS software.

Connect Iowa continues to utilize a customized online survey hosted through SurveyMonkey, with a landing page on the Connect Iowa website that was developed during the first reporting period. This survey, in combination with a customized data-gathering spreadsheet, was distributed on a regular basis to a targeted list of CAI throughout the state as well as organizations and agencies that work closely with the CAI. The distributions were completed with the support of the state client. Connect Iowa will continue to use these data-gathering tools for future targeted outreach efforts throughout the coming months leading up to the next reporting period. These materials are customized to fit the CAI categories as defined in the SBI NOFA.

The survey can be accessed at this link: http://www.surveymonkey.com/s/RRZ9KHC

In addition to the survey, Connect Iowa has developed a number of new relationships with statewide associations, such as the Education SuperHighway, the Iowa Department of Education, and the Iowa Department of Public Safety, to promote the importance of broadband connectivity at Community Anchor Institutions and participation in this data collection process. It is apparent that these relationships are beneficial to the entire success of the grant program, and the CAI engagement is a logical extension of new and existing relationships. Connect Iowa will continue to build upon these new relationships over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

In addition to fostering and building relationships with state agencies, associations, and organizations, Connect Iowa has also developed a sector-specific calendar that supports CAI outreach as well as research and communications efforts. This focused approach allows a corporate commitment to capturing CAI data in addition to developing meaningful sector-specific content. Since the October 2012 submission, the sector-specific approach included a month-long public safety campaign in February 2013. During this campaign, Connect Iowa committed to improve relationships with key stakeholders, distribute survey requests to sector representatives, and provide sector-specific education through communications and webinar resources. Outreach to and survey of hospitals, local law enforcement, and fire stations helps build awareness and establishes a centralized database of key connectivity data for planning.

Connect Iowa conducts significant research as part of an ongoing process to identify existing, centralized sources for CAI connectivity data. In tandem with these efforts to identify existing data, Connect Iowa continues to identify key CAI contacts in an effort to distribute and promote the online survey and raise awareness of the importance of CAI broadband connectivity. Also, when possible, Connect Iowa works with the Iowa Economic Development Authority to identify existing relationships that can support CAI outreach.

Connect Iowa has an ongoing mission to educate CAI throughout the state on the importance of participating in the project. Participation by these institutions will raise awareness about the importance of broadband connectivity and the need to report the requested data for inclusion on the National Broadband Map.

The greatest challenge with collecting CAI data continues to be educating the CAI about the Connect Iowa project as well as self-awareness of their own broadband connectivity (specifically upload and download speeds). Connect Iowa will continue to research key CAI organizations and agency contacts in an effort to raise awareness of this project among CAI. When applicable, the Iowa Economic Development Authority will continue to be briefed on the current CAI data and provided information so it can assist with outreach and promotion within the state.

A CAI summary of all processed and submitted data is provided below:

CAI Type	Total	Physical Address	Lat/Long	Technology of Transmission	Download Speed	Upload Speed
K-12 Schools	1879	1879	1863	166	167	166
Libraries	603	603	594	314	399	233
Healthcare	177	177	174	68	60	60
Public Safety	1193	1193	1181	104	87	88
Higher Ed Institutions	104	104	99	31	31	31
Other Government	679	679	676	298	251	280
Other Non-Government	6	6	6	4	5	4
Total	4641	4641	4593	985	1000	862

During the coming months, CAI data collection will be supported by regular reporting to the Connect Iowa team. The CAI data is proving an invaluable resource to all components of the Connect Iowa effort. The data identifies potential local champions, sector trends, and opportunities for improvement as well as opportunities to educate CAI not familiar with their current connectivity.

SBI Data Submission Methodology

The submission of the broadband dataset for April 1, 2013, is contained within the SBI Data Transfer Model and additional components as released on the Grantee Workspace on December 14, 2012. Connected Nation (CN) has reviewed all literature that relates to the release and use of this data transfer model and recognizes that it does not replace or dictate how data is stored, processed, or displayed for the state, as it is meant primarily as a means to transfer the broadband data from all states and territories and populate the National Broadband Map in a seamless fashion.
Connected Nation has complied with the following guidance documents published by NTIA:

- Technical Mapping Guide, as released on the Grantee Workspace on March 24, 2011, was followed to ensure the completeness and validity of the submission through completion steps and checklists, completing the DataPackage spreadsheet, uploading broadband datasets into the Data Transfer Model, and checking the dataset using the SBDD_CheckSubmission receipt process.
- Naming Conventions and Category of End User, as released on the Grantee Workspace on March 26, 2012, was followed to ensure the consistency of individual file and zip package naming.
- Wireless Data Processing Guidance, as sent to SBI grantees on February 8, 2013, was followed to ensure that all fixed and mobile wireless provider coverage records are submitted to NTIA as separate, closed polygons whenever there is a variation in any of the required fields.

In addition to the methodologies contained herein, the Changes and Corrections documentation, as well as the DataPackage.xls containing contact information, the data dictionary, and a provider summary table, the following feature classes are submitted within the SBI Data Transfer Model for the state of Iowa.

Inventory of Deliverables, Connect Iowa: April 1, 2013

NOFA Requirement	Data Transfer Model	Data Description
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in Census Blocks of No Greater Than Two Square Miles in Area.
Appendix A: 1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census Blocks Larger in Area Than Two Square Miles.
Appendix A: 1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address.
Appendix A: 3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points.
Appendix A: 4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing.

The provider data collected by CN on behalf of the state of Iowa have been formatted per the given specifications and uploaded into the appropriate feature classes of the SBI Data Transfer Model. Wireline availability is contained within census blocks and road segments, wireless availability is contained as polygons of coverage areas, and middle-mile connections and Community Anchor Institutions are contained as point data. All speed data is contained at the census block, road segment, or wireless polygon level of availability. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information as possible.

Connected Nation has continued outreach to satellite providers on their availability, technology, and speed information, but granular coverage is not yet available. Submitted within the wireless feature class are the satellite companies providing service to Iowa as a polygon of the state boundary. Efforts will continue to collect, process, or otherwise create more granular satellite data based on availability analyses and guidance received from NTIA. Process development continues as well to be able to create more granular satellite coverage based on satellite equipment positioning and geographic inputs.

DATASETS FOR IN-KIND MATCH

Connect Iowa received a listing of Community Anchor Institution (CAI) addresses and technology data from the Iowa Communications Network as part of an in-kind match contribution to assist Connect Iowa with its mapping and planning goals - $25.

IOWA FIELD VALIDATION METHODOLOGY

CN focused a portion of its time on specific validation processes such as:

- conducting random spectrum analysis studies throughout the state using an Avcom PSA-37-XP spectrum analyzer;
- conducting mobile speed tests throughout the state using an iPhone, Android (or other smart phone) as well as provider-specific aircards (Sprint 3G/4G, Clearwire et al);
- identifying pre-selected, provider-submitted wireless transmit tower sites and cross-referencing data about that tower against the Federal Communications Commission (FCC) databases such as Antenna Structure Registration and/or the Universal Licensing System;
- cross-referencing Federal Registration Number data against available FCC Form 477 data as well as the FCC **CO**mmission **RE**gistration **S**ystem (CORES);
- validating provider submitted data (for example: latitude/longitude) using a handheld Garmin eTrex Summit GPS unit or GPS enabled software such as Microsoft *Streets & Trips*;
- locating physical wire-line attributes (such as Central Offices, Remote Terminals, CATV plant, etc.) and comparing them against provider submitted data; and

- conducting on-net and off-net speed tests using the FCC portal at http://www.broadband.gov/qualitytest/about/ or using the Ookla Net Metrics enabled speed test utility located on each of CN's program specific websites.

Additionally, CN cross-referenced numerous public documents in order to ensure that all known broadband providers were located and contacted. This included searching membership logs from trade associations (WISPA, WCAI, PCIA, etc.), the Cable Television Fact Book, Public Utility Commission records, Public Service Commission records, Chamber of Commerce, etc.

To date, Connected Nation's staff has conducted on-site validation tests in Iowa on the following providers: Ace Telephone Association; Algona Municipal Utilities; Alliance Communications; Alpine Communications; Ambercomm; Arcadia Telephone; AT&T Inc.; Atkins Telephone; Aventure Communications; Ayrshire Farms Mutual Telephone Company; BEVCOMM; Bitwind Communications LLC; Brooklyn Mutual Telecommunications Cooperative; Butler-Bremer; Cable ONE Inc.; Casey Mutual Telephone Company; Cedar Falls Utilities; Central Scott Telephone; CenturyLink (acquired Qwest Corporation); Chat Mobility; Circle Computer Resources (d.b.a. Cramer IT); Citizens Mutual Telephone Cooperative; City of Hawarden; Clarence Telephone Company; Clear Lake Independent Telephone; Clearwire Corporation; CML Telephone Cooperative Association of Meriden, Iowa; Colo Telephone Company; Communications 1 Network; Community Cable Television Agency of O'Brien County; Community Digital Wireless; Complete Communication Services; Coon Rapids Municipal; Coon Valley Cooperative Telephone; Cooperative Telephone Company; Cooperative Telephone Exchange; Cornbelt Telephone; Cumberland Telephone; Danville Mutual Telephone Company; Dumont Telephone; East Buchanan Telephone Cooperative; Ellsworth Cooperative Telephone Exchange; Evertek Enterprises; Farmers & Merchants Mutual Telephone Company; Farmers Cooperative Telephone Company-Dysart; Farmers Mutual Cooperative Telephone Company – Harlan; Farmers Mutual Telephone Company-Jesup; Farmers Telephone Company-Essex (also d.b.a. Heartland Net); Farmers Mutual Telephone of Stanton; Fenton Co-Op Telephone Company; FiberComm LC; Frontier Communications Corporation; Goldfield Access Network; Grand Mound Cooperative; Grand River Mutual Telephone Corporation; Griswold Cooperative Telephone; Grundy Center Municipal Utilities; Harlan Municipal Utilities; Hickory Tech; Hospers Telephone Exchange; Hubbard Cooperative Telephone Association and Cable; Huxley Communications Cooperative; I-35 Telephone Company; IAMO Telephone Company; ImOn Communications; Internet Consulting Services LLC; Internet Solver, Inc.; Iowa Connect Inc.; Iowa Network Services; Iowa Telecom Service Inc.; JAB Wireless (formerly d.b.a. KeyOn Communications, Dynamic Broadband, NetConX and Prairie iNet); Jefferson Telephone Company; Junction Telephone; Kalnet; Kalona Cooperative Telephone Company; KDSC Inc.; Killduff Telephone; La Motte Telephone Company Inc.; LaPorte City Telephone Company; Laurens Municipal Communications Utility; Leap Wireless International; Lehigh Telephone; Lenox Municipal Utilities; LoganNet; Lone Rock Cooperative Telephone Company; Long Lines; Lost Nation-Elwood Telephone Company; Mabel Cooperative Telephone; Mahaska Communications Group; Manning Municipal; Marne and Elkhorn Telephone; Martelle Telephone; Massena Telephone Company; MCC Iowa (d.b.a. Mediacom Iowa LLC); Mediapolis Telephone Company; MidIowa Net; Miles Cooperative Telephone Association; Milford Cable TV Inc.; Minburn Communications; Minerva Valley Telephone Cablevision, Inc.; Monarc Technologies; Muscatine Power & Water (d.b.a. MachLink); Mutual Telephone Company; Mutual Telephone

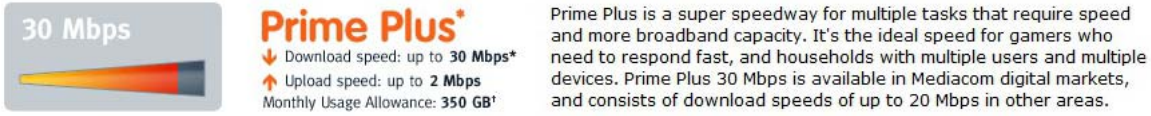
Company of Morning Sun Iowa; Nexgen Integrated Communications, LLC; New Ulm Telecom, Inc.; Northern Iowa Telephone Company; Northwest Telephone Company; Ogden Telephone Company; OmniTel Communications; Osage Municipal Communications Utility; Palmer Telephone; Panora Communications Cooperative; Partner Communications Cooperative; Peoples Telephone; Premier Communications; Radcliffe Telephone Company, Inc.; Readlyn Telephone; Reasnor Telephone; RingTel Communications; River Valley Telecommunications Cooperative; Rockwell Cooperative Telephone Association; Royal Telephone Company; Ruralwaves Wireless Internet; Sac County Mutual Telephone; Scranton Telephone Company; Sharon Telephone Company; SpeedNet LLC (d.b.a. Speed Connect); Spencer Municipal Utilities; Sprint Nextel Corporation; Sully Telephone Association; Superior Telephone Cooperative; Swisher Telephone; Templeton Telephone Company; Terril Telephone Cooperative; Titonka Telephone; T-Mobile USA; Traer Municipal Utilities; U.S. Cellular; USA Communications (d.b.a. Farmers Mutual Telephone Cooperative-Shellsburg); Van Buren Telephone Company Inc.; Verizon Communications Inc.; Villisca Farmers Telephone Company; Walnut Telephone Company; Webb Dickens Telephone Corporation; Webster-Calhoun-Cooper Telephone Association; Wellman Cooperative Telephone Association; West Liberty Telephone Company (also d.b.a. Cloudburst 9 LLC and Liberty Communications); Western Iowa Networks; Western Iowa Telephone Association; WideOpenWest Finance, LLC; Windstream (d.b.a. Iowa Telecom Services); Winnebago Cooperative Telecom Association; Woolstock Mutual Telephone; and WTC Communications, Inc.

From program initiation through this reporting period, CN has completed in-the-field validation testing against 156 companies (out of a universe of 197 viable providers) totaling 79.20 percent within the state of Iowa.

CN has also continued to review provider datasets for accurate speed information, platform listings, and other intricacies that may fall outside of the standard SBI Data Transfer Model parameters, as published on the NTIA Grantee Workspace on December 14, 2012. Any providers whose submitted coverage and attributes are anticipated to come into question have been further reviewed and confirmed; details on a case-by-case basis are presented below.

Farmers Mutual Telephone – Nora Springs
Issue: Technology of transmission code 40 with maximum advertised download speed in tier 8, lower than expected value range for the technology.
Resolution: Provider confirmed that they offer tier 8 speeds on DOCSIS 3.0.

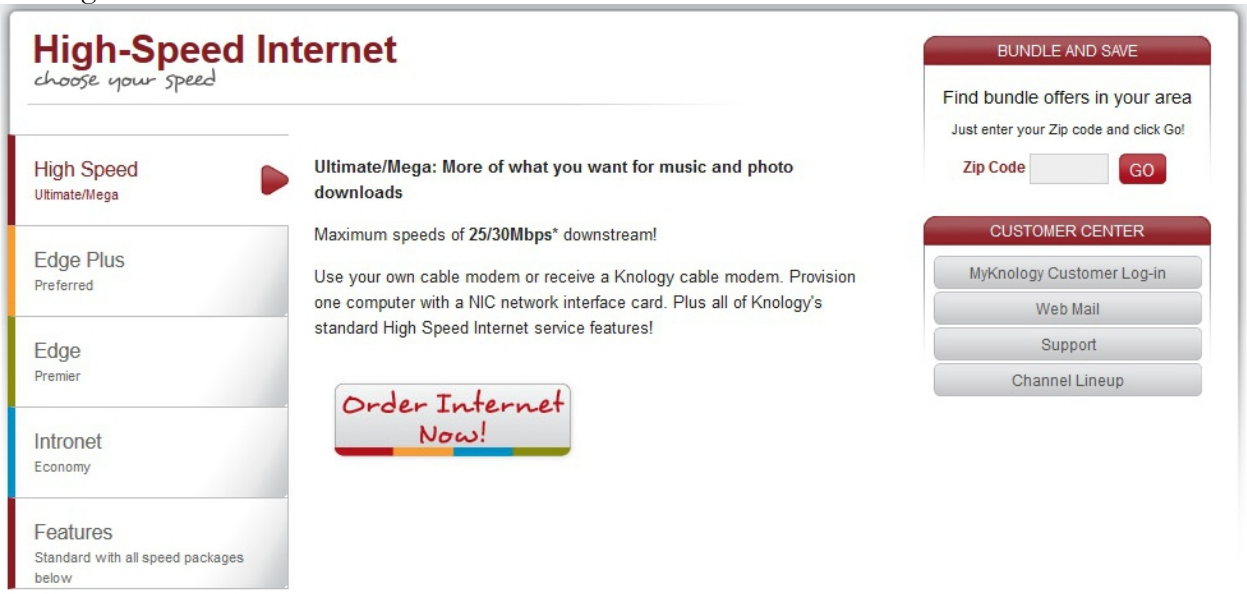
Mediacom Communications Corporation
Issue: Technology of transmission code 40 with maximum advertised download speed in tier 8, lower than expected value range for the technology.
Resolution: Provider website advertises 30 Mbps download speed; screenshot below.



Osage Municipal Utilities
Issue: Technology of transmission code 41 with maximum advertised download speed in tier 8, higher than expected value range for the technology.
Resolution: Provider website advertises 25 Mbps service; screenshot below.

Speed	Residential	Business
Lite (1 mbps/512 kbps)	$29.95	$29.95
Plus (10/2 mbps)	$45.95	$55.95
Premium (15/4 mbps)	$65.95	$75.95
Extreme (25/10 mpbs)	$99.95	$249.95

WideOpenWest Finance, LLC.
Issue: Technology of transmission code 40 with maximum advertised download speed in tier 8, lower than expected value range for the technology.
Resolution: Provider website advertises 25 Mbps service; screenshot below. Please note that while WOW! acquired Knology, the WOW! website still displays Knology-based web pages for this state's coverage.



Data Submission and Coverage Estimation of Non-Participating Provider (NPP)

As part of its ongoing broadband mapping efforts, CN has developed a series of processes with the goal of submitting coverage estimation mapping data to NTIA for every known and qualifying last-mile broadband provider, regardless of platform type (cable modem, DSL, fixed wireless, etc.).

The section below provides a summary of the status of CN's outreach and findings on all non-participating provider coverage for the April 2013 SBI submission.

Rural Waves

The coverage estimation for Rural Waves was not updated from the previous submission in October 2012. The full white paper containing the most recent coverage estimation for this provider can be found within the October 2012 submission to NTIA.

PROVIDER VALIDATION METHODOLOGY

Broadband providers maintain their service area data in many different formats, all in varying levels of complexity and granularity. In order to ensure that the data required by the NTIA is standardized across all providers and that it is as accurate as possible, CN translates and formats the data that providers are able to supply into a GIS shapefile and produces maps for the provider to review. The resulting map(s) and review process allow for providers to see their service area in a geographic format – for some providers, this is the first time they have seen maps of their broadband service area. Having the mapped service area allows providers to quickly identify any issues that appear in the data representation, whether the issue is in the data translation into a GIS format or from the original data collection and submission. Often data is provided from various sources and through the review and revision process, local engineers who operate the networks and work in the field are able to ensure that the tabular data that has been submitted is accurate and represents the real-world network extent. Any issues in how the service area is represented on the map(s) are remedied by CN, whether they are additions, removal of service, or any other revisions. Revised maps of service area representations are sent to the provider for review and approval; CN will revise data and return maps as many times as necessary until the provider is in agreement that the map represents their service area as accurately as possible. Once the review process has been completed and final approval of the data is provided, the data is deemed ready for NTIA submission.

Once the data collection has been aggregated at a statewide level, static maps of statewide and county-level availability are produced and made publicly available. In addition, consumers can visit the interactive online tool, My ConnectView, to create customized views of broadband service areas and analyze corresponding demographic information. Leveraging broadband service data on various platforms allows for public users, providers, and other stakeholders to review, scrutinize, and provide feedback on the represented data. This feedback becomes a validation method in itself, as consumers submit inquiries to CN either affirming where service is not available or identifying areas where broadband service is shown on the map, but in actuality is not available. This allows for a follow-up to providers regarding revisions to the data as it is represented; it also allows for CN to identify locations where on-site visits may be necessary to complete field validation of available services. Public feedback on all forms of mapping products serves as a localized validation method for provider-supplied information and allows CN to resolve inaccuracies as they are identified to ensure that only the highest quality information is provided to stakeholders.

Additionally, non-participating provider narratives that were submitted in previous mapping cycles are subjected to the same level of scrutiny. Occasionally, a provider may elect to voluntarily

participate (thus eliminating the need for future data estimation activities in the field). However, more often than not, the NPP narrative is updated with a combination of data gleaned from the provider's website, data obtained through FCC research and/or data collected/verified in the field by a CN staff engineer.

Estimates derived from provider-validated data indicate that approximately 1.77 percent of Iowa households do not have terrestrial fixed broadband service available, and approximately 0.01 percent of Iowa households have neither mobile nor fixed broadband service available.

Within rural areas of the state, results derived from provider-validated data indicate that approximately 3.19 percent of rural Iowa households do not have terrestrial fixed broadband service available, and approximately 0.01 percent of rural Iowa households have neither mobile nor fixed broadband service available. Please note that the availability estimates presented are based on Census 2010 household information.

The estimates above, in accordance with NTIA's definition of available broadband service as specified in the SBI NOFA, include broadband service with download speeds of at least 768 Kbps and upload speeds greater than 200 Kbps.

In addition, due to the nature of the SBI data collection methodology as defined by the NTIA and based on both census block geographic units and street segment data, the estimates of broadband availability derived from provider-validated data may include an overstatement of the actual number of households with broadband availability. Under the census block-based data collection method, a provider will typically report broadband availability for an entire census block whether its network is present across the whole or only a subset of that census block. This potential overestimation at the census block level can be amplified as the data is aggregated across the entire state.

WIRELESS METHODOLOGY

Broadband Service Availability in Provider's Service Area
Wireless Services Not Provided to a Specific Address

Data solicited from a fixed wireless provider to create propagation models include, but are not limited to:

1. The name of the structure.
2. Whether the transmitting device is operational or proposed.
3. The maximum advertised downstream speed, the maximum advertised upstream speed.
4. The typical downstream speed, the typical upstream speed (peak periods for both).
5. The frequency range of spectrum being used (as prescribed by NTIA). This may include (but is not limited to) spectrum authorizations identified within the Federal Communications Commission (FCC) Universal Licensing System (ULS) database or

located on the FCC's Spectrum Dashboard. This research often proves to be exceptionally effective when estimating the coverage area of an NPP.

6. The primary population center(s) being served (for geopolitical boundary reference).
7. The physical address of the transmit site (in the event latitude/longitude is unavailable from the provider this allows a quick reference point for geocoding).
8. Latitude in either Degrees, Minutes, and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
9. Longitude in either Degrees, Minutes and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
10. Antenna pattern (e.g. omnidirectional, 180°, 120°, 90°, etc.).
11. Azimuth of antenna (e.g. 360° with magnetic declination if known).
12. Approximate transmit radius (in feet, miles, or kilometers).
13. Polarity of transmit antenna (Vertical or Horizontal).
14. Transmit antenna gain (in dBi).
15. Line loss (applicable only to providers using coax, heliax, waveguide or other forms of cabling – excludes power-over-Ethernet devices).
16. Mechanical and/or Electrical beam tilt (if applicable).
17. Equipment Manufacturer (allows easy cross-reference against manufacturer's specification sheet).
18. Power output of the transmitting device (if unknown, FCC standards or manufacturer specifications are applied).
19. AMSL at base of tower site.
20. Antenna centerline AGL (height of antenna above ground level measured at the centerline of the actual antenna).
21. Foliage factors (Evergreens/Deciduous and percent of ground cover).
22. Ground Clutter (primarily used in rural areas to account for foliage and in metropolitan areas to account for types and heights of buildings if known).
23. Average gain of receive antenna.
24. Receive antenna is estimated at height above average terrain (HAAT) of 6.2 meters/20 feet.
25. Federal Registration Numbers (if applicable) which may allow opportunities to cross-reference and/or obtain additional data from the FCC's ULS and the **CO**mmission **RE**gistration **S**ystem.

Propagation modeling combines scientific data and empirical mathematical formulation for the characterization of radio wave propagation as a function of frequency, distance, and other conditions. Propagation software(s) typically use the Irregular Terrain Model (also known as Longley-Rice) of radio propagation for frequencies between 20 MHz and 20 GHz. This model is based on electromagnetic theory and statistical analyses of the combination of terrain features and radio measurements, then predicting the median attenuation of a radio signal as a function of

distance and the variability of the signal in time and in space. For metropolitan areas, the software can typically be adjusted to use the Okumura-Hata model, which accounts for predicting the behavior of cellular transmissions in areas where buildings are the primary obstructions. The resulting product from either model depicts a graphical illustration of the theoretical propagation characteristics of a selected frequency range based on defined variables (receiver sensitivity of the home/mobile device, foliage factor, and digital elevation terrain input).

After converting propagation models into a geospatial format, additional processing is completed to remove the small pixels representing service present in the resulting dataset. These areas are initially created based on the parameters entered in the software from the provider equipment information, the underlying data parameters of elevation, hill shade, etc., and the limitations of the software itself to display a broadband service area as accurately as possible. Generally, these random pixel striations appear as a result of signal levels reaching the highest elevated points within the prescribed radius. Typically, while this pixilation anomaly shows legitimate areas where signals can be received, these highly elevated points may have exceedingly sparse populations or are entirely void of population. As a result, and congruent to the *Wireless Technology Methodologies and Business Logic* white paper submitted to NTIA on January 20, 2011, all independent pixels representing service that are less than 0.125 square miles in area have been removed from the geospatial representation of each wireless provider.

BROADBAND INQUIRIES METHODOLOGY

CN collects consumer feedback in the form of broadband inquiries (BBIs). These inquiries represent any type of communication received from the public regarding broadband service. Once BBIs are received across the state, this information is overlaid with the broadband availability information which was collected through the SBI program. This allows for a real-world comparison of the broadband landscape to the information received from broadband inquiries. Consumers submitting these inbound comments and/or inquiries are able to provide information regarding five categories: 1) residents who do not have broadband but want it; 2) residents who have broadband but want a different provider; 3) residents who do not have broadband, but the broadband inventory maps indicate that they do; 4) residents who have broadband but want a faster connection speed; and 5) residents who have broadband but want a less expensive service option.

BBIs are submitted frequently by consumers via the Connect Iowa website. Inquiries often seek help to identify local broadband provider options, or to learn when a specific provider may be able to provide service to that consumer. Consumer comments also provide information which may help modify maps with actual service area information. The primary objectives of CN regarding these inquiries are 1) to improve the accuracy of the state maps with submitted consumer information and follow-up field research; 2) to provide broadband options to consumers through cooperation with mapped providers and by facilitating new broadband service options; and 3) to map and analyze information from consumers about areas of unmet broadband demand and alternatives to currently mapped services. A prime example of the second option is the utilization of the Rural Utility Service satellite eligibility tool. By simply entering the consumer's address, the CN

engineer can quickly determine if the consumer meets the initial qualification status for BIP satellite subsidies.

New BBIs are assigned to either the GIS department or the Engineering & Technical Services (ETS) team depending on the category entered by the consumer on the website submission form. The GIS or ETS team members respond to each inquiry according to the information entered by the consumer. Many BBIs can be resolved through desktop research; however, if a BBI requires research in the field, the assigned ETS team member conducts such research when performing field validations in the area of the inquiry, or at another such time as is practical and appropriate. GIS and ETS team members respond to and conclude BBIs via telephone contact and/or e-mail communication.

The broadband inquiry process has been implemented in each of the CN state programs with successful results. Altogether CN has received over 18,839 broadband inquiries since 2007, allowing the state programs to evaluate each inquiry for broadband demand and data verification. These inquiries are continuously examined against current broadband availability, updated every six months, to determine if previously unserved households have been expanded to and can now receive broadband at their residence. This database of broadband inquiries has also allowed the CN state programs to aggregate demand in concentrated areas to show providers the exact locations where the population has made it clear that they would purchase broadband if it was made available to them. Providers in the states have responded to this process and have expanded to areas knowing that their investment will be worthwhile. Data verification methods have also proven successful, as the state programs have been able to show those inquiries that indicate the broadband service areas are misrepresented on the map to providers, who then verify where service cannot reach in regard to that residence(s). The broadband coverage in these states has been altered to create a more accurate map based on the inquiries submitted by the public.

During this reporting period, the Connect Iowa project has received a total of 19 inquiries (237 grant inception to date). As more inquiries are submitted to Connect Iowa, a more thorough validation of the broadband landscape can be performed, while also allowing providers to see which areas have a high demand for broadband adoption.

MY CONNECTVIEW METHODOLOGY

My ConnectView is an interactive online mapping tool for viewing, analyzing, and validating broadband data. Developed using Esri's ArcGIS for Server and Adobe's Flex Framework and hosted and maintained by Connected Nation, My ConnectView is a multi-functional, user-friendly way for local leaders, policymakers, consumers, and technology providers to devise a plan for the expansion and adoption of broadband.

First and foremost, My ConnectView allows consumers to locate their residence and identify providers that offer broadband Internet service to that location. The interactive platform allows for users to build and evaluate broadband expansion scenarios using a wealth of data, including several coverage analysis layers, speed analyses, Community Anchor Institutions, and tools to search and

export household demographic information, as well as extract data in GIS, spreadsheet, and/or PDF formats.

My ConnectView also features more interactive data layers and additional tools than ever before to allow the consumer to explore the broadband data. My ConnectView provides consumers with the ability to print, e-mail, and provide feedback on the broadband data displayed on the interactive map. Through the collection of this feedback, a visual demand for broadband is presented. This visualization allows the CN state programs the ability to validate the broadband availability for accuracy. If residents within a region state they are without broadband, but the interactive map shows otherwise, this allows CN to approach the providers within that area in an effort to trim down their coverage to more accurately represent real-world availability on the ground.

The Connect Iowa project launched My ConnectView on April 2, 2012, and has received 1,292 visits this reporting period; to date the interactive mapping application has received 9,325 visits.

SPEED TEST METHODOLOGY

The 599 speed tests that are represented in the Connect Iowa Speed Test Report during this reporting period (5,732 grant inception to date) are the result of a partnership between CN and Ookla Net Metrics. Utilizing this relationship increases the level of confidence in the data being collected and provides for a far greater sample size than could be collected by a single testing site.

Ookla owns and operates Speedtest.net, as well as develops and deploys speed tests, such as the Connect Iowa speed test website, for partners around the world. This network of sites that is developed and run on its testing technology provides Ookla with a vast dataset that, due to the variability of geographic information collected across the varying speed test sites, is geocoded utilizing Geo-IP technology. This technology allows for tests to be geocoded to points of aggregation, typically larger nodes across provider networks. While there are hundreds of thousands of tests that have been conducted, the level of aggregation is only sufficient for county-level detail due to the test results being located at these larger nodes and not at an absolute location for each speed test.

In an effort to validate broadband data from the Connect Iowa project, speed test information is collected throughout the state. Speed tests provide speed information on the path taken through all networks (a provider's network as well as additional networks) a local machine must connect to in order to reach the host test. The benefit of this collection of speed information is two-tiered. First, it allows for a comprehensive dataset of speeds, while also providing Connect Iowa with the information on where broadband services are available. Second, unlike theoretical speed information which may be received through the data collection process, the use of speed tests provide real-world information on the speeds that currently exist within the state of Iowa.

PROVIDERS DEEMED NON-VIABLE

The following list of companies represents the remainder of the broadband provider universe that was originally identified as complete for outreach to begin for the State Broadband Initiative. These providers are not included in the Data Package for the April 2013 submission because they have been deemed non-eligible under the parameters and guidance of the SBI grant program. This list of companies includes, but is not limited to: providers offering service but below the current definition of broadband, those that have gone out of business, technology consulting firms, infrastructure or network construction companies, non-facilities based general resellers, etc.

	Company Name	URL	Comments
1	21Globe, Inc.	n/a	This company is not a broadband provider.
2	360networks	http://www.360networks.com	Acquired by another company.
3	650Net	n/a	This company is not a broadband provider.
4	A 007 Access	n/a	This company is a nonfacilities-based reseller.
5	AAA Internet Service	n/a	This company is no longer in business.
6	Aaccess Network Communications	n/a	This company is not a broadband provider.
7	Access Media 3, Inc.	n/a	This company has no service offerings in Iowa.
8	Access123.net	n/a	This company is not a broadband provider.
9	ACERX.NET	n/a	This company is not a broadband provider.
10	Affinity Wireless Solutions, LLC	n/a	This company was acquired by KeyOn Communications.
11	Airespring, Inc.	http://www.airespring.com/	This company is a nonfacilities-based reseller.
12	Airewaves Broadband, LLC	n/a	This company is no longer in business.

13	AirNet	n/a	This company is no longer in business.
14	American Relay	n/a	This company is not a broadband provider.
15	Arrowheadnet.com	n/a	This company is not a broadband provider.
16	Bannon Communications	n/a	This company is not a broadband provider.
17	bargainisp.net	n/a	This company is not a broadband provider.
18	Barnes City Cooperative Telephone Company	n/a	This company is not a broadband provider.
19	Bel-Net Network Services	n/a	This company is no longer in business.
20	Broadband National	http://www.broadbandnational.com/	This company is not a broadband provider.
21	BTC	n/a	This company was acquired by Western Iowa Networks.
22	Cable Television	n/a	This company is no longer in business.
23	Calhoun County Electric Co-Op	n/a	This company is not a broadband provider.
24	Camino-Net Internet Services	n/a	This company is not a broadband provider.
25	Cannon Valley Telecom, Inc.	n/a	This company does business in MN.
26	Celito Communications	n/a	This company has no service offerings in Iowa.
27	cFree Wireless Network	n/a	This company is no longer in business.
28	CFY-CyberNet	n/a	This company is doing business as Cedar Falls Utilities.
29	City of Brookings Telephone Fund	http://www.swiftel.net/	This company is a nonfacilities-based reseller of Sprint.

30	Cleartouch.Com	n/a	This company is no longer in business.
31	Com Link	n/a	This company is no longer in business.
32	Comelec Services, Inc.	n/a	Acquired by another company.
33	CommSpeed Iowa, L.L.C.	n/a	This company was acquired by SpeedNet, LLC.
34	Community Internet Service	n/a	This company is no longer in business.
35	Covad Communications	n/a	This company has no service offerings in Iowa.
36	CyberStorm Wireless	n/a	This company is no longer in business.
37	Deltaforce	n/a	This company is not a broadband provider.
38	deluxehost.com	n/a	This company is not a broadband provider.
39	DGUI	n/a	This company is no longer in business.
40	Dial National	n/a	This company is no longer in business.
41	Dialer.net	n/a	This company is not a broadband provider.
42	Digital Telecommunications, Inc.	n/a	This company is no longer in business.
43	DSL @ Interlync	http://www.interlync.com/	This company is a nonfacilities-based reseller.
44	DTS-NET.COM	n/a	This company is a nonfacilities-based reseller.
45	Dura Cable	n/a	This company is not a broadband provider.
46	EarthLink Business	http://www.earthlinkbusiness.com/	This company is a nonfacilities-based reseller.

47	Farmers Telephone Company - Batavia	http://www.bataviatelephone.com	This company offers service but it is below the FCC definition of broadband.
48	Fast Dependable Access	n/a	This company is no longer in business.
49	Forbin Wireless	http://www.forbin.net/	This company offers service but it is below the FCC definition of broadband.
50	fyreSTORM Wireless	n/a	This company is no longer in business.
51	Global Crossing Telecommunications, Inc.	http://www.globalcrossing.com	Acquired by another company.
52	Great Lakes Communication Corp.	http://www.glccom.com	This company offers service but it is below the FCC definition of broadband.
53	Hubwest	n/a	This company is not a broadband provider.
54	Hubwest Protected Networks LLC	n/a	This company is not a broadband provider.
55	I Spot ACCESS	n/a	This company is not a broadband provider.
56	Imbris, Inc.	n/a	This company is no longer in business.
57	IMGISP.NET	n/a	This company is not a broadband provider.
58	Incredible Networks	n/a	This company is no longer in business.
59	Indianola Municipal Utilities	n/a	This company is not a broadband provider.
60	Inercom Communications, Inc.	n/a	This company is no longer in business.
61	Interactiveinfo.com Inc.	n/a	This company does business in New York and has no service offerings in Iowa.
62	Inter-County Cable Company	n/a	This company is doing business as Brooklyn Mutual Telecommunications Cooperative.

63	Interlink LC	n/a	This company is no longer in business.
64	Iowa Cable and Telecommunications Association	n/a	This company is not a broadband provider.
65	Iowa City Telecommunications	n/a	This company is not a broadband provider.
66	Iowa Connect, Inc.	http://www.iowaconnect.com/	Acquired by another company.
67	IowaOne.net	n/a	This company is no longer in business.
68	IPNS	n/a	This company does business in Oregon and has no service offerings in Iowa.
69	iRadical	n/a	No information found for this company.
70	i-rule.net	n/a	This company is no longer in business.
71	ISPartner.net	n/a	No information found for this company.
72	Jenco Speed Web	n/a	This company offers fixed wireless in Ohio and has no service offerings in Iowa.
73	Knology of the Plains, Inc.	http://www.knology.com/	Acquired by another company.
74	LCSisp.com	n/a	This company is not a broadband provider.
75	LightEdge Solutions, Inc.	n/a	This company is not a broadband provider.
76	Lightyear Network Solutions, LLC	http://lightyear.net/	This company is a nonfacilities-based reseller.
77	Local Link	n/a	This company has no service offerings in Iowa.
78	Longview Communications	n/a	This company has no service offerings in Iowa.

79	MainBoard	n/a	This company has no service offerings in Iowa.
80	Maine Cable and Wireless	n/a	No information found for this company.
81	Manilla Telephone Company	n/a	This company was acquired by Farmers Mutual Telephone Cooperative of Harlan, IA.
82	Maple Leaf Networks	n/a	This company has no service offerings in Iowa.
83	Marcin Company	n/a	No information found for this company.
84	Metropolitan Telecommunications Holding Company	n/a	This company is a nonfacilities-based reseller.
85	MFW Cable	n/a	This company is not a broadband provider.
86	Millenicom Inc.	http://www.millenicom.com/	This company is a nonfacilities-based reseller.
87	Nanomega.Com	n/a	This company is no longer in business.
88	NetAccess, Inc.	n/a	This company is not a broadband provider.
89	Netconnect	http://www.n-connect.net/	Acquired by another company.
90	NetConX, Inc.	http://www.netconx.net/wireless.shtml	Acquired by another company.
91	NetSpeed Online	n/a	This company is no longer in business.
92	New Century Telecommunications	n/a	This company is not a broadband provider.
93	New Edge Network, Inc.	n/a	Acquired by another company.
94	Northwest Internet Services	n/a	This company has no service offerings in Iowa.

95	Northwest ISP	n/a	This company is no longer in business.
96	One Communications Corporation	n/a	Acquired by another company.
97	Oneota Net	http://www.oneota.net/wirelessdsl.shtml	This company offers service but it is below the FCC definition of broadband.
98	OpenCom, Inc.	n/a	This company is a nonfacilities-based reseller.
99	OrbitCom, Inc.	n/a	This company is a nonfacilities-based reseller.
100	Overarch Broadband	n/a	This company has no service offerings in Iowa.
101	Pacific Internet Exchange	n/a	This company is a nonfacilities-based reseller.
102	PAETEC Communications, Inc.	http://www.paetec.com/	Acquired by another company.
103	Prairie Communication	n/a	This company is no longer in business.
104	Prairie Fire Internet	n/a	This company is no longer in business.
105	Prairie iNet	http://www.prairieinet.net/	Acquired by another company.
106	PremoWeb	n/a	This company is not a broadband provider.
107	Professional Computer Solutions	http://www.pcsia.net	This company offers service but it is below the FCC definition of broadband.
108	Quad-Cities Online Broadband Plus	n/a	This company is not a broadband provider.
109	RACOM	n/a	This company is not a broadband provider.
110	Rankin Communication Systems	n/a	This company is not a broadband provider.

111	RockRapids.net	n/a	This company is not a broadband provider.
112	S & S Wireless Internet	n/a	This company is no longer in business.
113	Siebring-Kruss Wireless	n/a	This company is no longer in business.
114	Simply Dialup A Metrogeek Company	n/a	This company is not a broadband provider.
115	SIRIS	n/a	This company is not a broadband provider.
116	Sling Broadband	n/a	This company has no service offerings in Iowa.
117	Sparkplug Central, Inc.	n/a	This company was acquired by Airband Communications.
118	Speakeasy DSL	n/a	This company is a backhaul provider and a general reseller of DSL; part of a 2010 merger between Covad, Megapath, and Speakeasy.
119	State Wireless	n/a	This company is not a broadband provider.
120	Support Corps of America	n/a	This company is no longer in business.
121	Surferz.Net	n/a	This company is not a broadband provider.
122	T1 Shopper	http://www.t1shopper.com/	This company is not a broadband provider.
123	Total Access Networks, Inc.	n/a	This company is not a broadband provider.
124	TRX, Inc.	n/a	This company is not a broadband provider.
125	TSISP.NET	n/a	This company is no longer in business.
126	Twin Rivers Valley	n/a	This company is no longer in business.

127	United Western Net	n/a	This company is no longer in business.
128	UNUM Telecommunications, Inc.	n/a	This company is no longer in business.
129	VPM Global Internet Services, Inc.	n/a	This company is a nonfacilities-based reseller.
130	WilTel Communications, LLC	n/a	This company was acquired by Level 3 Communications.
131	Wireless Roanoke, Inc.	n/a	This company is no longer in business.
132	wisbin	n/a	This company is not a broadband provider.
133	WispAir	n/a	This company is no longer in business.
134	www.AmericanAngel.us	n/a	This company is no longer in business.
135	YEYZOO.NET	n/a	This company is no longer in business.
136	YLISP (Your Local ISP)	n/a	This company is not a broadband provider.
137	YourT1Wifi.com	n/a	This company has no service offerings in Iowa.

APPENDIX A: BROADBAND PROVIDER LOG

Broadband Provider Log

Complete	362
Non-Responsive/Refused	2
In Progress	1
Reseller Providing Data	4
Count of Datasets by Status	**369**
Total Unique Providers Represented	**198**

Provider Name	Platform	Status	NDA Execution Date	Notes
Ace Telephone Association	Fixed Wireless	Data Added to Statewide Inventory	3/8/2010	[MAR-01-13 Matthew Brunt] Change: This is the initial submission for this platform.
Ace Telephone Association	DSL	Data Added to Statewide Inventory	3/8/2010	[FEB-21-13 Matthew Brunt] Change: Provider expanded DSL coverage and upgraded speeds to tier 7 download and tier 3 upload.
Alpine Communications, LC	Fiber	Data Added to Statewide Inventory	2/24/2010	[FEB-22-13 Matthew Brunt] Change: Provider expanded fiber coverage area.
AT&T Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/16/2009	[FEB-13-13 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Baldwin Nashville Telephone Company, Inc.	Fiber	Data Added to Statewide Inventory	2/3/2010	[JAN-24-13 Matthew Brunt] Change: Provider expanded fiber service area.
Butler-Bremer Communications	DSL	Data Added to Statewide Inventory	4/20/2010	[FEB-22-13 Matthew Brunt] Change: Provider converted a portion of their coverage area over to fiber.
Butler-Bremer Communications	Fiber	Data Added to Statewide Inventory	4/20/2010	[FEB-22-13 Matthew Brunt] Change: Provider expanded fiber coverage.
Cable ONE Inc.	Cable	Data Added to Statewide Inventory	12/7/2009	[FEB-12-13 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
CenturyLink	DSL	Data Added to Statewide Inventory	12/4/2009	[FEB-14-13 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
CenturyLink	Fiber	Data Added to Statewide Inventory	12/4/2009	[FEB-14-13 Matthew Brunt] Change: Initial submission from provider for this platform.
Citizens Mutual Telephone Cooperative	Fiber	Data Added to Statewide Inventory	2/26/2010	[FEB-06-13 Matthew Brunt] Change: Provider expanded fiber service area.
Clear Lake Independent Telephone Company	DSL	Data Added to Statewide Inventory	5/6/2020	[FEB-21-13 Matthew Brunt] Change: Provider converted portions of their DSL coverage area over to fiber. Speeds upgraded to tier 8 download and tier 7 upload.
Clear Lake Independent Telephone Company	Fiber	Data Added to Statewide Inventory	5/6/2020	[FEB-21-13 Matthew Brunt] Change: Provider expanded their fiber coverage area. Speeds upgraded to tier 10 download and tier 7 upload.
Colo Telephone Company	Fiber	Data Added to Statewide Inventory	1/28/2010	[FEB-5-13 Matthew Brunt] Change: Initial submission for this fiber coverage.
Community Cable Television Agency of O'Brien County	Fixed Wireless	Data Added to Statewide Inventory	5/5/2010	[FEB-23-13 Matthew Brunt] Change: Provider added an additional tower, changed spectrum to 3650-3700 MHz, and upgradedspeeds to tier 7 download.
Coon Valley Co-op Telephone Association, Inc.	Fixed Wireless	Data Added to Statewide Inventory		[FEB-26-13 Matthew Brunt] Change: Provider expanded fixed wireless coverage area.
CoxCom Inc.	Cable	Data Added to Statewide Inventory	1/29/2010	[FEB-14-13 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Cumberland Telephone Company	Fixed Wireless	Data Added to Statewide Inventory	4/27/2010	[FEB-26-13 Matthew Brunt] Change: Provider added two additional towers.
Dumont Telephone Company	Cable	Data Added to Statewide Inventory	2/25/2010	[JAN-16-13 Matthew Brunt] Change: Provider started offering cable service.
Dumont Telephone Company	DSL	Data Added to Statewide Inventory	2/25/2010	[JAN-15-13 Matthew Brunt] Change: Provider converted portions of the DSL coverage to fiber.
Dumont Telephone Company	Fiber	Data Added to Statewide Inventory	2/25/2010	[JAN-15-13 Matthew Brunt] Change: Provider expanded fiber coverage area.
Ellsworth Cooperative Telephone Association	Fiber	Data Added to Statewide Inventory	1/25/2010	[JAN-24-13 Matthew Brunt] Change: Provider converted entire service area over to fiber, and can provider tier 7 download speeds.
Evertek Enterprises	Cable	Data Added to Statewide Inventory	2/3/2010	[FEB-07-13 Matthew Brunt] Change: Portion of provider's coverage area sold to another provider.
Farmers & Merchants Mutual Telephone Company	Fixed Wireless	Data Added to Statewide Inventory	5/7/2010	[FEB-23-13 Matthew Brunt] Change: Provider added one additional tower.
Farmers Mutual Telephone Company - Nora Springs	Cable	Data Added to Statewide Inventory	1/26/2010	[FEB-22-13 Matthew Brunt] Change: Provider converted a portion of their cable coverage over to fiber.
Farmers Mutual Telephone Company - Nora Springs	DSL	Data Added to Statewide Inventory	1/26/2010	[FEB-22-13 Matthew Brunt] Change: Provider converted a portion of their DSL coverage area over to fiber.
Farmers Mutual Telephone Company - Nora Springs	Fiber	Data Added to Statewide Inventory	1/26/2010	[FEB-22-13 Matthew Brunt] Change: Provider expanded their fiber coverage area.
Frontier Communications Corporation	DSL	Data Added to Statewide Inventory	1/22/2010	[FEB-15-13 Matthew Brunt] Change: Provider added additional DSLAM locations.
Harmony Telephone Company	DSL	Data Added to Statewide Inventory	1/12/2010	[FEB-5-13 Matthew Brunt] Change and Correction: Provider indicated service area should be DSL rather than fiber; also increased speeds to Tier 6 download.
Heart of Iowa Communications Cooperative	Fiber	Data Added to Statewide Inventory	1/7/2010	[FEB-22-13 Matthew Brunt] Change: Provider expanded fiber coverage area and upgraded speeds to tier 7 download.
Heart of Iowa Communications Cooperative	Fixed Wireless	Data Added to Statewide Inventory	1/7/2010	[FEB-25-13 Matthew Brunt] Change: This is the initial submission for this provider's fixed wireless coverage.

ImOn Communications, LLC	Cable	Data Added to Statewide Inventory	2/8/2012	[FEB-25-13 Matthew Brunt] Change: Provider expanded cable coverage area.
ImOn Communications, LLC	Fiber	Data Added to Statewide Inventory	2/8/2012	[FEB-25-13 Matthew Brunt] Change: Initial fiber submission for this provider.
Interstate 35 Telephone Company	Fiber	Data Added to Statewide Inventory	2/2/2010	[FEB-22-13 Matthew Brunt] Change: Provider expanded fiber coverage and upgraded speeds to tier 9 download and tier 8 upload.
Interstate 35 Telephone Company	Fiber	Data Added to Statewide Inventory	2/2/2010	[FEB-22-13 Matthew Brunt] Change: Provider expanded fiber coverage and upgraded speeds to tier 9 download and tier 8 upload.
Leap Wireless International, Inc.	Mobile Wireless	Data Added to Statewide Inventory	4/6/2010	[FEB-12-13 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
LISCO Wireless	DSL	Data Added to Statewide Inventory	1/28/2010	[FEB-26-13 Matthew Brunt] Change: Provider stopped offering DSL service to a portion of their service area.
LISCO Wireless	Fiber	Data Added to Statewide Inventory	1/28/2010	[FEB-26-13 Matthew Brunt] Change: Provider expanded fiber service area.
Loganet	Fixed Wireless	Data Added to Statewide Inventory	2/13/2013	[FEB-26-13 Matthew Brunt] Change: Provider expanded fixed wireless coverage area and upgraded speeds to tier 7 download and tier 6 upload.
Marne & Elk Horn Telephone Company	DSL	Data Added to Statewide Inventory	2/11/2010	[JAN-30-13 Matthew Brunt] Change: Provider converted a portion of their DSL coverage area over to fiber.
Marne & Elk Horn Telephone Company	Fiber	Data Added to Statewide Inventory	2/11/2010	[JAN-29-13 Matthew Brunt] Change: Provider started offering fiber broadband in portions of their service area.
Massena Telephone Company	Fixed Wireless	Data Added to Statewide Inventory	6/18/2010	[FEB-25-13 Matthew Brunt] Change: This is the initial submission for this provider's fixed wireless coverage.
Mediacom Communications Corporation	Cable	Data Added to Statewide Inventory	1/12/2010	[FEB-19-13 Matthew Brunt] Change: Provider expanded service area.
Miles Cooperative Telephone Association	DSL	Data Added to Statewide Inventory	5/17/2010	[JAN-28-13 Matthew Brunt] Change: Provider converted portions of their DSL coverage area over to fiber.
Miles Cooperative Telephone Association	Fiber	Data Added to Statewide Inventory	5/17/2010	[JAN-28-13 Matthew Brunt] Change: Provider expanded fiber coverage area.
Minburn Communications	Fixed Wireless	Data Added to Statewide Inventory	4/7/2010	[FEB-25-13 Matthew Brunt] Change: This is the initial submission for this provider's fixed wireless coverage.
Northeast Iowa Telephone Company	Fiber	Data Added to Statewide Inventory	4/13/2010	[JAN-28-13 Matthew Brunt] Change: Provider expanded fiber service area and upgraded speeds to tier 5 upload in some areas.
Northern Iowa Telephone Company	Fiber	Data Added to Statewide Inventory	1/25/2010	[FEB-5-13 Matthew Brunt] Change: Provider started offering fiber broadband services.
Northwest Telephone Cooperative Association	DSL	Data Added to Statewide Inventory	2/17/2010	[FEB-26-13 Matthew Brunt] Change: Provider expanded their DSL coverage area and upgraded speeds to tier 7 download and tier 4 upload.
Northwest Telephone Cooperative Association	Fixed Wireless	Data Added to Statewide Inventory	2/17/2010	[FEB-26-13 Matthew Brunt] Change: Provider expanded fixed wireless coverage area and upgraded a portion of their speeds to tier 7 download and tier 3 upload.
Olin Telephone Company, Inc.	Fiber	Data Added to Statewide Inventory	2/23/2010	[FEB-1-13 Matthew Brunt] Change: Provider started offering fiber broadband service.
Panora Communications Cooperative	Fixed Wireless	Data Added to Statewide Inventory	1/29/2010	[FEB-23-13 Matthew Brunt] Change: Provider added one additional tower, with tier 5 download and tier 3 upload speeds.
Premier Communications	Fiber	Data Added to Statewide Inventory	1/25/2010	[FEB-21-13 Matthew Brunt] Change: Provider expanded fiber coverage area.
Schaller Telephone Company	DSL	Data Added to Statewide Inventory		[FEB-28-13 Matthew Brunt] Change: This is the initial submission for this provider.
Skycasters	Satellite	Data Added to Statewide Inventory	10/16/2012	[DEC-04-12 Matthew Brunt] Correction: Initial submission of provider's coverage, but they were in service previously.
South Slope Cooperative Telephone Company	Fiber	Data Added to Statewide Inventory	2/2/2010	[FEB-21-13 Matthew Brunt] Change: Provider expanded fiber coverage area.
Sprint Nextel Corporation	Mobile Wireless	Data Added to Statewide Inventory	1/14/2010	[FEB-12-13 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Sully Telephone Association Inc	Fixed Wireless	Data Added to Statewide Inventory	4/28/2010	[FEB-25-13 Matthew Brunt] Change: This is the initial submission for this provider's fixed wireless coverage.
Sully Telephone Association Inc	DSL	Data Added to Statewide Inventory	4/28/2010	[FEB-27-13 Matthew Brunt] Correction: Minor coverage corrections made to previously submitted data.
T-Mobile USA, Inc.	Mobile Wireless	Data Added to Statewide Inventory	1/8/2010	[FEB-22-13 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
United States Cellular Corporation	Mobile Wireless	Data Added to Statewide Inventory	2/15/2011	[FEB-12-13 Matthew Brunt] Change: Provider submitted new 4G LTE coverage areas to be added to the current mobile footprint.
USA Communications	Fiber	Data Added to Statewide Inventory	1/27/2010	[FEB-5-13 Matthew Brunt] Change: Provider expanded fiber coverage.
Verizon Communications, Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/14/2009	[FEB-13-13 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Walnut Telephone Company	DSL	Data Added to Statewide Inventory	4/14/2010	[JAN-29-13 Matthew Brunt] Change: Provider converted portions of their DSL service area over to fiber.
Walnut Telephone Company	Fiber	Data Added to Statewide Inventory	4/14/2010	[JAN-29-13 Matthew Brunt] Change: Provider expanded fiber service area.
West Iowa Telephone Company	DSL	Data Added to Statewide Inventory	1/27/2010	[FEB-5-13 Matthew Brunt] Change: Provider converted portions of their DSL service area over to fiber.
West Iowa Telephone Company	Fiber	Data Added to Statewide Inventory	1/27/2010	[FEB-1-13 Matthew Brunt] Change: Provider expanded fiber coverage.
West Liberty Telephone Company	Fixed Wireless	Data Added to Statewide Inventory	1/25/2010	[FEB-23-13 Matthew Brunt] Change: Provider added two additional towers.

Winnebago Cooperative Telecom Association	DSL	Data Added to Statewide Inventory	1/22/2010	[FEB-27-13 Matthew Brunt] Change: Provider converted portions of their DSL service area over to fiber, and upgraded some speeds to tier 7 download/tier 5 upload.
Winnebago Cooperative Telecom Association	Fiber	Data Added to Statewide Inventory	1/22/2010	[FEB-27-13 Matthew Brunt] Change: Provider expanded their fiber service area, and upgraded their speeds to tier 7 download and upload.
Bernard Telephone Company, Inc.	Backhaul	Backhaul Provider Only Processing Complete	5/19/2010	
Butler-Bremer Communications	Backhaul	Backhaul Provider Only Processing Complete	4/20/2010	
Iowa Network Services	Backhaul	Backhaul Provider Only Processing Complete	3/5/2010	
Level 3 Communications, LLC	Backhaul	Backhaul Provider Only Processing Complete	12/14/2009	
Mediacom Communications Corporation	Backhaul	Backhaul Provider Only Processing Complete	1/12/2010	
Minburn Communications	Backhaul	Backhaul Provider Only Processing Complete	4/7/2010	
Northwest Telephone Cooperative Association	Backhaul	Backhaul Provider Only Processing Complete	2/17/2010	
Sharon Telephone Company	Backhaul	Backhaul Provider Only Processing Complete	5/20/2010	
West Liberty Telephone Company	Backhaul	Backhaul Provider Only Processing Complete	1/25/2010	
Winnebago Cooperative Telecom Association	Backhaul	Backhaul Provider Only Processing Complete	1/22/2010	
Woolstock Mutual Telephone	Backhaul	Backhaul Provider Only Processing Complete	5/19/2010	
Atkins Telephone Company	DSL	Speed Only Update; Data Processing Complete	5/14/2010	[FEB-07-13 Matthew Brunt] Change: Provider upgraded speeds to tier 5 download and tier 4 upload.
Cooperative Telephone Exchange	Fiber	Speed Only Update; Data Processing Complete	2/2/2010	[JAN-15-13 Matthew Brunt] Change: Provider upgraded speeds to tier 8 download and upload.
Dixon Telephone Company	Cable	Speed Only Update; Data Processing Complete	5/5/2010	[FEB-07-13 Matthew Brunt] Change: Provider upgraded speeds to tier 5 download and tier 4 upload.
F&B Communications, Inc.	DSL	Speed Only Update; Data Processing Complete	2/19/2010	[FEB-21-13 Matthew Brunt] Change: Provider upgraded speeds to tier 7 download.
F&B Communications, Inc.	Fiber	Speed Only Update; Data Processing Complete	2/19/2010	[FEB-21-13 Matthew Brunt] Change: Provider upgraded speeds to tier 8 download and upload.
Griswold Cooperative Telephone Company	DSL	Speed Only Update; Data Processing Complete	4/21/2010	[FEB-20-13 Matthew Brunt] Change: Provider upgraded speeds to tier 7 download in a portion of their coverage area.
HickoryTech Corporation	DSL	Speed Only Update; Data Processing Complete	2/2/2010	[FEB-22-13 Matthew Brunt] Change: Provider upgraded typical downlaod speed to tier 6.
Hughes Network Systems, LLC	Satellite	Speed Only Update; Data Processing Complete	2/5/2010	[MAR-06-13 Matthew Brunt] Change: Provider now offers tier 7 downlaod speeds.
Independence Telecommunications Utility	Cable	Speed Only Update; Data Processing Complete	4/9/2010	[FEB-15-13 Matthew Brunt] Change: Provider upgraded speeds to tier 7 download and tier 5 upload.
Kalona Cooperative Telephone Company	DSL	Speed Only Update; Data Processing Complete	1/20/2010	[JAN-24-13 Matthew Brunt] Change: Provider upgraded typical downlaod speed to tier 5.
Kalona Cooperative Telephone Company	Fiber	Speed Only Update; Data Processing Complete	1/20/2010	[JAN-24-13 Matthew Brunt] Change: Provider upgraded speeds to tier 8 download and tier 5 upload.
Lenox Municipal Utilities	Fiber	Speed Only Update; Data Processing Complete	4/20/2010	[JAN-15-13 Matthew Brunt] Change: Provider upgraded speeds to tier 7 download and upload.
Massena Telephone Company	DSL	Speed Only Update; Data Processing Complete	6/18/2010	[JAN-22-13 Matthew Brunt] Change: Provider upgraded speeds to tier 7 download and tier 4 upload.
Minburn Communications	Fiber	Speed Only Update; Data Processing Complete	4/7/2010	[FEB-27-13 Matthew Brunt] Change: Provider upgraded speeds to tier 7 download. All DSL has been converted to fiber.
Modern Cooperative Telephone Company Inc.	DSL	Speed Only Update; Data Processing Complete		[FEB-15-13 Matthew Brunt] Change: Provider upgraded speeds to tier 5 download.
North English Cooperative Telephone Company	DSL	Speed Only Update; Data Processing Complete	5/12/2010	[FEB-07-13 Matthew Brunt] Correction: Provider's download speed changed to tier 5.
Prairieburg Telephone Company, Inc	DSL	Speed Only Update; Data Processing Complete	3/25/2010	[FEB-15-13 Matthew Brunt] Change: Provider upgraded speeds to tier 5 download.
Prairieburg Telephone Company, Inc	Fixed Wireless	Speed Only Update; Data Processing Complete	3/25/2010	[FEB-15-13 Matthew Brunt] Change: Provider upgraded speeds to tier 5 download and tier 3 upload.
Reasnor Telephone Company, LLC	DSL	Speed Only Update; Data Processing Complete		[FEB-15-13 Matthew Brunt] Change: Provider upgraded speeds to tier 5 download.
Sharon Telephone Company	DSL	Speed Only Update; Data Processing Complete	5/20/2010	[FEB-15-13 Matthew Brunt] Change: Provider upgraded speeds to tier 6 download.
Sharon Telephone Company	Fiber	Speed Only Update; Data Processing Complete	5/20/2010	[FEB-15-13 Matthew Brunt] Change: Provider upgraded speeds to tier 6 download and tier 3 upload.
SpeedNet, LLC	Fixed Wireless	Speed Only Update; Data Processing Complete		[FEB-15-13 Matthew Brunt] Change: Provider updated a portion of their coverage area to tier 5 download.
Terril Telephone Cooperative	DSL	Speed Only Update; Data Processing Complete	2/12/2010	[FEB-15-13 Matthew Brunt] Correction: Provider download speed changed to tier 5.
Van Horne Cooperative Telephone Company	Fiber	Speed Only Update; Data Processing Complete	5/18/2010	[JAN-22-13 Matthew Brunt] Correction: Provider upload speeds changed to tier 3.
West Liberty Telephone Company	DSL	Speed Only Update; Data Processing Complete	1/25/2010	[FEB-25-13 Matthew Brunt] Change: Provider upgraded speeds to tier 6 download and tier 3 upload.
Windstream Communications	DSL	Speed Only Update; Data Processing Complete		[FEB-28-13 Matthew Brunt] Change and/or Correction: Provider sent updated speeds for portions of their service area.
RuralWaves Wireless Internet	Fixed Wireless	No Update-Estimated Coverage Submitted for Non-Participating Provider		
Jab Wireless, Inc.	Fixed Wireless	Approval for Update Not Received – Data Still Submitted	6/14/2010	[MAR-13-13 Matthew Brunt] Change: Provider acquired fixed wireless from Airband Communications, You Squared, NetConnect, Comelec Services, Prairie iNet, and NetConX.
Ace Telephone Association	Backhaul	No Update to Provide	3/8/2010	

Algona Municipal Utilities	Cable	No Update to Provide	2/9/2010	
Algona Municipal Utilities	Fiber	No Update to Provide	2/9/2010	
Alliance Communications Cooperative, Inc.	Backhaul	No Update to Provide	1/28/2010	
Alliance Communications Cooperative, Inc.	Fiber	No Update to Provide	1/28/2010	
Alpine Communications, LC	DSL	No Update to Provide	2/24/2010	
Alta Municipal Utilities	Cable	No Update to Provide	5/18/2010	
Andrew Telephone Company	DSL	No Update to Provide	1/19/2010	
Arcadia Telephone Cooperative	DSL	No Update to Provide	5/6/2010	
AT&T Inc.	Backhaul	No Update to Provide	12/16/2009	
Atkins Telephone Company	Fiber	No Update to Provide	5/14/2010	
Aventure Communications	Backhaul	No Update to Provide	4/8/2010	
Aventure Communications	Fixed Wireless	No Update to Provide	4/8/2010	
Ayrshire Farmers Mutual Telephone Company	DSL	No Update to Provide	2/17/2010	
Ayrshire Farmers Mutual Telephone Company	Fixed Wireless	No Update to Provide	2/17/2010	
Baldwin Nashville Telephone Company, Inc.	DSL	No Update to Provide	2/3/2010	
Bellevue Municipal Utilities	Fiber	No Update to Provide	5/20/2010	
Bernard Telephone Company, Inc.	DSL	No Update to Provide	5/19/2010	
Bernard Telephone Company, Inc.	Fiber	No Update to Provide	5/19/2010	
Bernard Telephone Company, Inc.	Fixed Wireless	No Update to Provide	5/19/2010	
BEVCOMM	DSL	No Update to Provide	6/16/2010	
BitWind Communications, LLC	Fixed Wireless	No Update to Provide		
Board of Water Electric & Communication Trustees of the City of Mus	Cable	No Update to Provide	5/14/2010	
Board of Water Electric & Communication Trustees of the City of Mus	Fiber	No Update to Provide	5/14/2010	
Board of Water Electric & Communication Trustees of the City of Mus	Fixed Wireless	No Update to Provide	5/14/2010	
Butler-Bremer Communications	Cable	No Update to Provide	4/20/2010	
Cascade Communications Company	DSL	No Update to Provide	1/23/2010	
Cascade Communications Company	Fiber	No Update to Provide	1/23/2010	
Casey Mutual Telephone Company	Backhaul	No Update to Provide	5/3/2010	
Casey Mutual Telephone Company	DSL	No Update to Provide	5/3/2010	
Cedar Falls Utilities	Cable	No Update to Provide	6/16/2010	
Cedar Falls Utilities	Fiber	No Update to Provide	6/16/2010	
Center Junction Telephone Company	DSL	No Update to Provide	3/12/2010	
Central Scott Telephone Company, Inc.	DSL	No Update to Provide	4/22/2010	
Central Scott Telephone Company, Inc.	Fixed Wireless	No Update to Provide	4/22/2010	
CenturyLink	Backhaul	No Update to Provide	12/4/2009	
Chat Mobility	Mobile Wireless	No Update to Provide	1/19/2010	
Circle Computer Resources	Fixed Wireless	No Update to Provide	7/6/2010	
Citizens Mutual Telephone Cooperative	DSL	No Update to Provide	2/26/2010	
City of Hawarden	Cable	No Update to Provide	5/20/2010	
CML Telephone Cooperative Association of Meriden, Iowa	Fiber	No Update to Provide	1/25/2010	
Colo Telephone Company	Fiber	No Update to Provide	1/28/2010	
Community Cable Television Agency of O'Brien County	Cable	No Update to Provide	5/5/2010	
Community Digital Wireless, LLC	Fixed Wireless	No Update to Provide	5/6/2010	
Complete Communication Services	Cable	No Update to Provide	6/17/2010	
Complete Communication Services	Fiber	No Update to Provide	6/17/2010	
Coon Creek Telecommunications Corp.	DSL	No Update to Provide	2/9/2012	
Coon Rapids Municipal Utilities	Cable	No Update to Provide	4/22/2010	
Coon Valley Co-op Telephone Association, Inc.	DSL	No Update to Provide		
Cooperative Telephone Company	DSL	No Update to Provide	2/2/2010	
Cooperative Telephone Company	Fixed Wireless	No Update to Provide	2/2/2010	
Cooperative Telephone Exchange	Backhaul	No Update to Provide	2/2/2010	
Corn Belt Telephone Company	DSL	No Update to Provide	2/15/2010	
Corn Belt Telephone Company	Fiber	No Update to Provide	2/15/2010	
Corn Belt Telephone Company	Fixed Wireless	No Update to Provide	2/15/2010	
Cumberland Telephone Company	DSL	No Update to Provide	4/27/2010	
Danville Mutual Telephone Company	DSL	No Update to Provide		
Dunkerton Telephone Cooperative	DSL	No Update to Provide	4/15/2010	
East Buchanan Telephone Cooperative	DSL	No Update to Provide	4/30/2010	
Evertek Enterprises	Fiber	No Update to Provide	2/3/2010	
Evertek Enterprises	Fixed Wireless	No Update to Provide	2/3/2010	
Farmers & Merchants Mutual Telephone Company	Fiber	No Update to Provide	5/7/2010	
Farmers Cooperative Telephone Company-Dysart	DSL	No Update to Provide	3/12/2010	
Farmers Mutual Cooperative Telephone Company - Harlan	Cable	No Update to Provide	2/5/2010	
Farmers Mutual Cooperative Telephone Company - Harlan	DSL	No Update to Provide	2/5/2010	
Farmers Mutual Cooperative Telephone Company - Harlan	Fiber	No Update to Provide	2/5/2010	
Farmers Mutual Cooperative Telephone Company - Harlan	Fixed Wireless	No Update to Provide	2/5/2010	
Farmers Mutual Cooperative Telephone Company-Moulton	Fiber	No Update to Provide	5/21/2010	
Farmers Mutual Telephone Company - Jesup	DSL	No Update to Provide	4/20/2010	
Farmers Mutual Telephone Company - Jesup	Fiber	No Update to Provide	4/20/2010	
Farmers Mutual Telephone Company - Nora Springs	Fixed Wireless	No Update to Provide	1/26/2010	
Farmers Mutual Telephone Company of Stanton, Iowa	Backhaul	No Update to Provide	4/9/2010	
Farmers Mutual Telephone Company of Stanton, Iowa	Cable	No Update to Provide	4/9/2010	
Farmers Mutual Telephone Company of Stanton, Iowa	DSL	No Update to Provide	4/9/2010	
Farmers Mutual Telephone Company of Stanton, Iowa	DSL	No Update to Provide	4/9/2010	
Farmers Telephone Company-Essex	DSL	No Update to Provide	1/27/2010	
Farmers Telephone Company-Essex	Fixed Wireless	No Update to Provide	1/27/2010	
Fibernet Communications, LLC	Backhaul	No Update to Provide	3/9/2010	
Frontier Communications Corporation	Backhaul	No Update to Provide	1/22/2010	
Grundy Center Municipal Utilities	Cable	No Update to Provide		
Grundy Center Municipal Utilities	Fixed Wireless	No Update to Provide		
Harlan Municipal Utilities	Cable	No Update to Provide	5/5/2010	
Hawkeye Telephone Company	DSL	No Update to Provide	2/12/2010	
Heart of Iowa Communications Cooperative	Backhaul	No Update to Provide	1/7/2010	
Heart of Iowa Communications Cooperative	DSL	No Update to Provide	1/7/2010	
Hospers Telephone Exchange, Inc.	Cable	No Update to Provide	1/11/2010	
Hospers Telephone Exchange, Inc.	DSL	No Update to Provide	1/11/2010	
Hubbard Cooperative Telephone Association and Cable	DSL	No Update to Provide	5/14/2010	
Huxley Communications Cooperative	Backhaul	No Update to Provide	1/25/2010	
Huxley Communications Cooperative	DSL	No Update to Provide	1/25/2010	
Huxley Communications Cooperative	Fiber	No Update to Provide	1/25/2010	
IAMO Telephone Company	DSL	No Update to Provide	1/25/2010	
IAMO Telephone Company	Fixed Wireless	No Update to Provide	1/25/2010	
IMU Network Services	Fiber	No Update to Provide	5/10/2010	
IMU Network Services	Fixed Wireless	No Update to Provide	5/10/2010	
Interstate 35 Telephone Company	Fixed Wireless	No Update to Provide	2/2/2010	
Jab Wireless, Inc.	DSL	No Update to Provide	6/14/2010	
Jefferson Telephone Company	DSL	No Update to Provide	1/22/2010	
Jefferson Telephone Company	Fiber	No Update to Provide	1/22/2010	
Kalnet	Fixed Wireless	No Update to Provide	5/21/2010	
Keystone Farmers Cooperative Telephone Company	DSL	No Update to Provide	4/12/2010	
Killduff Telephone Company	DSL	No Update to Provide		
La Motte Telephone Company, Inc.	DSL	No Update to Provide	2/16/2010	
La Motte Telephone Company, Inc.	Fiber	No Update to Provide	2/16/2010	
La Motte Telephone Company, Inc.	Fixed Wireless	No Update to Provide	2/16/2010	
La Porte City Telephone Co	DSL	No Update to Provide	2/22/2010	

Laurens Municipal Communications Utility	Cable	No Update to Provide	6/2/2010	
Lehigh Valley Cooperative Telephone Association	Fiber	No Update to Provide	4/16/2010	
LISCO Wireless	Backhaul	No Update to Provide	1/28/2010	
Lone Rock Cooperative Telephone Company	DSL	No Update to Provide	2/15/2010	
Long Lines	Backhaul	No Update to Provide	5/4/2010	
Long Lines	Backhaul	No Update to Provide	5/4/2010	
Long Lines	Backhaul	No Update to Provide	5/4/2010	
Long Lines	Backhaul	No Update to Provide	5/4/2010	
Long Lines	Backhaul	No Update to Provide	5/4/2010	
Long Lines	Backhaul	No Update to Provide	5/4/2010	
Long Lines	Cable	No Update to Provide	5/4/2010	
Long Lines	DSL	No Update to Provide	5/4/2010	
Lost Nation-Elwood Telephone Company	Fiber	No Update to Provide	4/13/2010	
Lynnville Telephone Company, Inc.	DSL	No Update to Provide		
Mabel Cooperative Telephone Company	DSL	No Update to Provide	4/8/2010	
Manning Municipal Communication & Television System Utility	Cable	No Update to Provide	4/22/2010	
Manning Municipal Communication & Television System Utility	Fixed Wireless	No Update to Provide	4/22/2010	
Marne & Elk Horn Telephone Company	Backhaul	No Update to Provide	2/11/2010	
Marne & Elk Horn Telephone Company	Fixed Wireless	No Update to Provide	2/11/2010	
Martelle Cooperative Telephone Association	Cable	No Update to Provide	5/5/2010	
Martelle Cooperative Telephone Association	DSL	No Update to Provide	5/5/2010	
Massena Telephone Company	Backhaul	No Update to Provide	6/18/2010	
Mediapolis Telephone Company	DSL	No Update to Provide	4/14/2010	
MidIowa Net	DSL	No Update to Provide		Reseller providing data.
MidIowa Net	Fixed Wireless	No Update to Provide		
Midwest Broadband LLC	Fixed Wireless	No Update to Provide	7/6/2010	[FEB-12-13 Layne Wagner] There were no changes in service as of December 31, 2012, but according to a company representative they plan to close down the business on March 1, 2013.
Milford Cable TV Inc.	Cable	No Update to Provide	4/21/2010	
Minburn Communications	DSL	No Update to Provide	4/7/2010	
Minburn Communications	Fiber	No Update to Provide	4/7/2010	
Minerva Valley Telephone Cablevision, Inc.	DSL	No Update to Provide	4/7/2010	
Monarc Technologies	Fiber	No Update to Provide	2/16/2011	
Mutual Telephone Company	Fiber	No Update to Provide	1/25/2010	
Mutual Telephone Company of Morning Sun, Iowa	DSL	No Update to Provide	5/5/2010	
Mutual Telephone Company of Morning Sun, Iowa	DSL	No Update to Provide	5/5/2010	
Mutual Telephone Company of Morning Sun, Iowa	Fixed Wireless	No Update to Provide	5/5/2010	
New Ulm Telecom, Inc.	DSL	No Update to Provide	3/10/2010	
Northeast Iowa Telephone Company	Backhaul	No Update to Provide	4/13/2010	
Northeast Iowa Telephone Company	DSL	No Update to Provide	4/13/2010	
Northeast Iowa Telephone Company	Fixed Wireless	No Update to Provide	4/13/2010	
Northern Iowa Telephone Company	DSL	No Update to Provide	1/25/2010	
Ogden Telephone Company	Backhaul	No Update to Provide	3/17/2010	
Ogden Telephone Company	DSL	No Update to Provide	3/17/2010	
Olin Telephone Company, Inc.	DSL	No Update to Provide	2/23/2010	
Onslow Cooperative Telephone Association	DSL	No Update to Provide	2/3/2010	
Oran Mutual Telephone Company	DSL	No Update to Provide	2/8/2010	
Osage Municipal Communications Utility	Cable	No Update to Provide	5/18/2010	
Osage Municipal Communications Utility	Fixed Wireless	No Update to Provide	5/18/2010	
Palmer Mutual Telephone Company	DSL	No Update to Provide	1/21/2010	
Palo Cooperative Telephone Association	DSL	No Update to Provide	5/19/2010	
Panora Communications Cooperative	Cable	No Update to Provide	1/29/2010	
Panora Communications Cooperative	Cable	No Update to Provide	1/29/2010	
Panora Communications Cooperative	Fiber	No Update to Provide	1/29/2010	
Panora Communications Cooperative	Fiber	No Update to Provide	1/29/2010	
Panora Communications Cooperative	Fixed Wireless	No Update to Provide	1/29/2010	
Partner Communications Cooperative	Cable	No Update to Provide	5/15/2010	
Partner Communications Cooperative	DSL	No Update to Provide	5/15/2010	
Partner Communications Cooperative	Fiber	No Update to Provide	5/15/2010	
Premier Communications	Cable	No Update to Provide	1/25/2010	
Preston Telephone Company	DSL	No Update to Provide	2/5/2010	
Readlyn Telephone Company	DSL	No Update to Provide	2/23/2010	
Readlyn Telephone Company	Fiber	No Update to Provide	2/23/2010	
Ringtel Communications	DSL	No Update to Provide	2/17/2010	
River Valley Telecommunications Coop	DSL	No Update to Provide	3/23/2010	
River Valley Telecommunications Coop	Fiber	No Update to Provide	3/23/2010	
River Valley Telecommunications Coop	Fixed Wireless	No Update to Provide	3/23/2010	
Rockwell Cooperative Telephone Association	Backhaul	No Update to Provide	5/12/2010	
Rockwell Cooperative Telephone Association	DSL	No Update to Provide	5/12/2010	
Rockwell Cooperative Telephone Association	Fiber	No Update to Provide	5/12/2010	
Rockwell Cooperative Telephone Association	Fixed Wireless	No Update to Provide	5/12/2010	[MAR-25-13 Ashley Hitt] Change: Provider acquired and now operates Iowa Connect fixed wireless system.
Royal Telephone Company	Fiber	No Update to Provide	2/12/2010	
Sac County Mutual Telephone Co.	Backhaul	No Update to Provide	2/15/2010	
Sac County Mutual Telephone Co.	DSL	No Update to Provide	2/15/2010	
Scranton Telephone Company	Backhaul	No Update to Provide	2/1/2010	
Scranton Telephone Company	DSL	No Update to Provide	2/1/2010	
Searsboro Telephone Company	DSL	No Update to Provide		
Sharon Telephone Company	Fixed Wireless	No Update to Provide	5/20/2010	
Sioux Valley Rural Television, Inc.	Fixed Wireless	No Update to Provide	6/7/2010	
South Slope Cooperative Telephone Company	DSL	No Update to Provide	2/2/2010	
Spacenet, Inc.	Satellite	No Update to Provide		
Spencer Municipal Utilities	Backhaul	No Update to Provide	2/18/2010	
Spencer Municipal Utilities	Cable	No Update to Provide	2/18/2010	
Spencer Municipal Utilities	Fiber	No Update to Provide	2/18/2010	
Spiral Communications LLC	Fixed Wireless	No Update to Provide		
Spring Grove Cooperative Telephone Co	Fiber	No Update to Provide		
Springville Cooperative Telephone Association, Inc.	DSL	No Update to Provide	2/15/2010	
Sprint Nextel Corporation	Backhaul	No Update to Provide	1/14/2010	
Superior Telephone Cooperative	DSL	No Update to Provide	5/24/2010	
Swisher Telephone Company	Fiber	No Update to Provide	2/2/2010	
Templeton Telephone Company	Backhaul	No Update to Provide	3/12/2010	
Templeton Telephone Company	DSL	No Update to Provide	3/12/2010	
Titonka Telephone Company	Backhaul	No Update to Provide	5/4/2010	
Titonka Telephone Company	DSL	No Update to Provide	5/4/2010	
Traer Municipal Utilities	Fixed Wireless	No Update to Provide	4/14/2010	
USA Communications	Cable	No Update to Provide	1/27/2010	
USA Communications	DSL	No Update to Provide	1/27/2010	
Van Buren Telephone Co Inc	DSL	No Update to Provide	1/26/2010	
Van Horne Cooperative Telephone Company	Backhaul	No Update to Provide	5/18/2010	
Van Horne Cooperative Telephone Company	DSL	No Update to Provide	5/18/2010	
ViaSat, Inc.	Satellite	No Update to Provide	1/8/2010	

Walnut Telephone Company	Backhaul	No Update to Provide	4/14/2010	
Walnut Telephone Company	Cable	No Update to Provide	4/14/2010	
Walnut Telephone Company	Fixed Wireless	No Update to Provide	4/14/2010	
Webb-Dickens Telephone Corporation	Fiber	No Update to Provide	1/25/2010	
Webster-Calhoun Cooperative Telephone Association	Fiber	No Update to Provide	5/21/2010	
Wellman Cooperative Telephone Association	DSL	No Update to Provide	5/19/2010	
Wellman Cooperative Telephone Association	Fiber	No Update to Provide	5/19/2010	
Wellman Cooperative Telephone Association	Fixed Wireless	No Update to Provide	5/19/2010	
West Iowa Telephone Company	Cable	No Update to Provide	1/27/2010	
West Liberty Telephone Company	Fiber	No Update to Provide	1/25/2010	
Western Iowa Networks	DSL	No Update to Provide	2/22/2010	
Western Iowa Networks	Fiber	No Update to Provide	2/22/2010	
Western Iowa Networks	Fixed Wireless	No Update to Provide	2/22/2010	
Western Iowa Telephone Association	DSL	No Update to Provide	4/22/2010	
WideOpenWest Finance, LLC	Cable	No Update to Provide		[MAR-07-13 Matthew Brunt] Change: WideOpenWest Finance, LLC acquired Knology; they are now a broadband provider for the state.
Winnebago Cooperative Telecom Association	Fixed Wireless	No Update to Provide	1/22/2010	[FEB-13-13 Layne Wagner] Received notice from a company representative that they plan to discontinue the fixed wireless platform by Q2 2013.
WTC Communications, Inc.	Cable	No Update to Provide	3/22/2010	
WTC Communications, Inc.	DSL	No Update to Provide	3/22/2010	
WTC Communications, Inc.	Fixed Wireless	No Update to Provide	3/22/2010	
Wyoming Mutual Telephone Company	DSL	No Update to Provide	2/19/2010	
Be Line Wireless	Fixed Wireless	No Update Provided – Use Last Submission Data	1/15/2013	[MAR-07-13 Matthew Brunt] Change: Be Line Wireless acquired East Buchanan Telephone Cooperative's fixed wireless service.
Brooklyn Mutual Telecommunications Cooperative	DSL	No Update Provided – Use Last Submission Data	4/21/2010	
Clarence Telephone Company, Inc.	Fiber	No Update Provided – Use Last Submission Data		
Cogent Communications, Inc.	Backhaul	No Update Provided – Use Last Submission Data		
Communications 1 Network, Inc.	Fiber	No Update Provided – Use Last Submission Data	4/14/2010	
Eastlight, LLC	Fixed Wireless	No Update Provided – Use Last Submission Data		
Fenton Co-Op Telephone Company	DSL	No Update Provided – Use Last Submission Data	4/16/2010	
FiberComm L.C.	Backhaul	No Update Provided – Use Last Submission Data	2/15/2010	
FiberComm L.C.	DSL	No Update Provided – Use Last Submission Data	2/15/2010	
FiberComm L.C.	Fixed Wireless	No Update Provided – Use Last Submission Data	2/15/2010	
Goldfield Access Network, L.C.	DSL	No Update Provided – Use Last Submission Data	1/22/2010	
Goldfield Access Network, L.C.	Fiber	No Update Provided – Use Last Submission Data	1/22/2010	Reseller providing data.
Goldfield Access Network, L.C.	DSL	No Update Provided – Use Last Submission Data	1/22/2010	Reseller providing data.
Grand Mound Cooperative Telephone Association	Fiber	No Update Provided – Use Last Submission Data		
Grand Mound Cooperative Telephone Association	DSL	No Update Provided – Use Last Submission Data		
Grand Mound Cooperative Telephone Association	Fixed Wireless	No Update Provided – Use Last Submission Data		
Grand River Mutual Telephone Corporation	Fixed Wireless	No Update Provided – Use Last Submission Data	2/5/2010	
Grand River Mutual Telephone Corporation	DSL	No Update Provided – Use Last Submission Data	2/5/2010	
Grand River Mutual Telephone Corporation	DSL	No Update Provided – Use Last Submission Data	2/5/2010	
Grand River Mutual Telephone Corporation	Fiber	No Update Provided – Use Last Submission Data	2/5/2010	
Internet Consulting Services, LLC	Fixed Wireless	No Update Provided – Use Last Submission Data	5/19/2010	
Internet Solver, Inc.	DSL	No Update Provided – Use Last Submission Data		Reseller providing data.
Nexgen Integrated Communications, LLC	DSL	No Update Provided – Use Last Submission Data		
Nexgen Integrated Communications, LLC	Fiber	No Update Provided – Use Last Submission Data		
Radcliffe Telephone Company, Inc.	Backhaul	No Update Provided – Use Last Submission Data	4/26/2010	
Radcliffe Telephone Company, Inc.	Fiber	No Update Provided – Use Last Submission Data	4/26/2010	
Woolstock Mutual Telephone	Fixed Wireless	No Update Provided – Use Last Submission Data	5/19/2010	
Woolstock Mutual Telephone	DSL	No Update Provided – Use Last Submission Data	5/19/2010	
Zayo Group, LLC	Backhaul	No Update Provided – Use Last Submission Data		
Windstream Communications	DSL	Solicited Initial Data		
Mechanicsville Telephone Company	DSL	Slated Field Audit for Estimated Coverage Analysis		In addition to numerous contact attempts made since October 2010, 4 contact attempts were made this period.
Mechanicsville Telephone Company	Fixed Wireless	Slated Field Audit for Estimated Coverage Analysis		In addition to numerous contact attempts made since April 2011, 4 contact attempts were made this period.

State Broadband Initiative Mapping Methodology

For the State of Idaho
Revised March 31, 2013

CostQuest Associates

LinkAMERICA Alliance

Contents

Overview

This document provides an overview of how the seventh required data set was collected and processed for the State Broadband Initiative (SBI) in the state of Idaho.

This submission builds upon prior efforts to increase in-state broadband mapping and planning capacity. Although each state has taken a slightly different path to building in house capacity, this cross-state partnership helps the LinkAMERICA team focus on comparable outcomes across the four states, where appropriate and support each state based upon the State's elected transition path. Our intent is not to make the states look and be the same, rather it is to leverage economies of scope and scale among the business processes while at the same time pursuing the longer term goal of transitioning sustainable program leadership to the respective states.

Work continues to shift to state partners. Much of this focuses upon the capacity building, planning and technical assistance components of the program. One immediate result of this is that in some of our states in-State partners have taken direct responsibility for the survey, validation and development of Community Anchor Institution information. The methods by which CAI data were developed are included as Appendix One. During this fourth program year we have one in State partner taking over the state web presence, both in terms of content and hosting. We also have States hiring in dedicated resources to support the program.

As expected, this document rests heavily on the prior drafts but has also been updated and expanded.

Significant changes include additions covering:

1. Trends in provider inputs
2. Modification to internal provider tracking
3. Increases in the amount of WISP coverage using propagation estimates or coverage obtained from Towercoverage.com
4. Requested changes based upon NTIA guidance
    a. Review of submitted speed with respect to NTIA supplied frequency table
    b. Review of NTIA speed guidelines, coverage processing and provider documentation
    c. Inclusion of Provider Universe Table (Appendix 4)
    d. Expansion of verification methods summary table
5. Transition planning with respect to capacity building within the State for Broadband map development (even while the technical data development components of the program continue to rest with CostQuest and the LinkAMERICA Alliance).

Treatment of the following subjects has been expanded:

1. Verification and validation
2. Data production methods
3. Provider advertised speed and coverage validation

As anticipated, the SBI program continues to mature and evolve. Technical leadership and strong program office guidance has been appreciated. We continue to focus resources on establishing stable business processes to track submissions, verify received and processed data, test for temporal stability and provide reporting deliverables consistent with NTIA expectations.

In our view, the mapping deliverable reflects (1) a good faith effort, which results in a reasoned response to the NOFA, Technical Appendix A, as well as supplementary program office guidance and modifications offered in phone calls, emails, and webinars, (2) a stable foundation for improvement and prioritization of both NTIA and state needs and interests , (3) a valid data processing model to support online mapping, consumer feedback, provider verification and reporting, and finally, (4) a valid use of the evolving data transfer model and its intrinsic validation methods. More importantly, the resulting data and online coverage maps that follow from this work are providing good input and context for the Broadband planning teams working across the states we have the pleasure to serve.

We also note that the mapping deliverable is increasingly important to state and federal policy makers as each assesses the policy ecosystem that supports the advancement of broadband access and adoption.

We close this methodology document with 4 appendices. Appendix 1 refers to efforts related to Community Anchor Institutions. Appendix 2 describes data collection challenges. This section describes some of the open issues, challenges and questions we are exploring. Our hope is to receive clarification and counsel from NTIA in how best to confront some of these issues, which are likely common across states. Appendix 3 describes the confidentiality framework explained by NTIA. Appendix 4 details the provider universe, those providers found to be non-NOFA compliant and those providing data.

Purpose of This Manual

This technical document was developed to provide transparency in our data production process.

Our goal is to illustrate a thoughtful process designed to meet the intent of the submission. Our hope is that we have developed a process that is reasonable, with respect to the data it deals with, as well as flexible enough to change with evolving NTIA requirements and lessons learned from the Broadband mapping community.

Data Sources

Developing the Provider List

Broadband provider lists for all states were developed from the following sources:

- Prior comparable mapping/research efforts
- State lists of regulated telecommunications, cable and wireless service providers
- State and national industry organizations (i.e. cable associations, wireless service provider organizations, telecommunications associations)
- FCC Form 477 respondents
- Third party data sources such as Warren Media, Media Prints, American Roamer Coverage Right, GeoResults Wirecenter Boundaries and TowerCoverage.com.
- Independent web searches
- Interviews with key state staff members and important community influencers

As one would expect in a dynamic marketplace, provider identification is an ongoing and important component of our work. Mergers and acquisitions, the use of multiple regional DBAs, the lack of any universal identity management attribute, and the generally complex parent-subsidiary structure of many telecommunications companies, make provider identification and tracking very challenging. Because of this dynamic environment, the Provider list is reviewed on an on-going basis and changes are made as necessary to ensure that the list remains current.

At the start of each round, email and telephone contact is made to all known providers. This time consuming, but necessary, process ensures that the list of contact persons remains current, and that providers are aware of data request changes and deadlines associated with each round. This also provides an initial read out if corporate policy has changed impacting willingness to submit updated information. Where necessary, we execute new NDAs with providers. We maintain this communication with providers throughout the Data Collection period, providing multiple paths and opportunities for participation in the program. Providers that respond too late to be included in the final dataset are flagged for inclusion in the next submission. Unresolved data concerns are also flagged and tracked so that we can begin working on a plan for resolution prior to the next data collection round.

As contact is made in each round, we qualify each provider by asking a series of questions regarding the type of service and speeds offered. If the provider does not meet the minimum specifications for a

Broadband provider (as defined in the NOFA) we make a note of the change in status.[1] Providers remain on our list and are included in program communications so that in the event that their service is upgraded or expanded their status can be updated accordingly.

Provider Outreach

To meet the program's aggressive deadlines and participation goals, LinkAMERICA believes it is critical to maintain rapport with providers. To do this we reach out to providers with regular project communications, including a program newsletter and links to the various State mapping websites. In several states we have participated in trade association and policy summits.

As described above, individual e-mails and/or telephone calls are made to all providers explaining the status of the program and requesting their continued support. In some instances we've also had the opportunity to support providers in their BTOP / BIP applications. Through these collective outreach initiatives, and our engagement with various industry associations, we continue to enjoy a healthy and appropriate relationship with Broadband service providers.

NDA

To provide protection for all parties involved, LinkAMERICA continues to honor the terms of our NDA. If providers did not execute the NDA in previous rounds they were offered the opportunity to do so in this collection round. New providers were of course also supplied with a copy of the NDA.

To facilitate the execution of NDA's, LinkAMERICA continues to use the DocuSign online document management solution. This system allows providers to review and digitally sign the NDA in a legally binding manner, and has been instrumental in achieving rapid approval and execution of NDAs with the majority of providers. In some cases, NDA's were individually negotiated to address specific provider concerns. In all cases, minimum standards established by the NOFA are honored. In other cases, providers chose to submit data without executing an NDA.

Provider Survey

Since six prior rounds of data collection have been completed, the LinkAMERICA team has a solid base of coverage and speed information with which to begin Round 7. This allowed us to provide flexible response options to participating providers. One option allowed them to review check maps of their coverage and speed data – submitting only corrections and additions to the existing dataset. (For provider convenience the check maps were created in both PDF and Google Earth (.KMZ) formats.) The second option was to allow submittal of completely new datasets, either in tabular form or in multiple other digital formats. For those without CAD or GIS systems, we continued to allow the submittal of printed/scanned maps and other written materials.

[1] As with other Grantees, we struggle with appropriate and consistent classification for service providers who opportunistically provision Broadband services. In this submission we continue to bring them into the analysis as a provider type "other". As the inclusion of this category isn't our primary goal, we are working to process data as we can. We are similarly categorizing and retaining reseller information. Appendix 4 illustrates the categorization of non Broadband providers within our provider tracking and verification systems.

Survey Methods

Once again, we used a secure digital survey process (via our provider portal websites) to collect and display information for providers. The Round 7 survey process was designed to accommodate both new and returning providers, and the different types of information they would be submitting. The following is a summary of the process encountered by each group:

New providers: New providers were routed directly to our standard survey where they were provided with templates for uploading data in tabular NTIA-compliant formats. As in previous rounds, if providers could not supply information in the requested format, alternatives were offered. These alternatives included uploading service-area boundary maps, exchange area maps, CAD drawings or customer address lists. From that information, the LinkAMERICA team developed a geographic representation of coverage and was able to build coverage features for each provider.

Returning providers: For Round 7 we continued to work with participating providers to improve their datasets. Check maps continue to be a useful tool to show providers how their area would be displayed on the resulting interactive state map and to get constructive feedback regarding corrections and changes that need to be made to their coverage and speed data. Generating these customized documents in each round is an extremely time consuming verification process, but it allows us to close many of the gaps that might have otherwise persisted.

Follow Up

After the release of the Round 7 survey in early January 2013,, LinkAMERICA launched an extensive effort to encourage responses. Every known provider was contacted at least twice during the months of January and February. The initial data submission deadline was set for mid-February, but we continued to accept "straggler" submissions into September.

No Response Policy

As mentioned above, every effort was made to contact each provider who appeared on our initial list. However, if no current information could be found on the company (i.e. no website, no valid phone number, and no contact person identified) they were removed from the list of "known providers". We believe the majority of those we were unable to reach were providers who have simply ceased to exist[2]. If we verify that a company is a broadband provider still doing business and are not able to get a response to our request for data, we make note of that in our datapackage.xls, and continue to reach out to encourage participation.

Summary

In summary, an intensive 45-60 day provider outreach and data collection process is initiated at the beginning of each round. In Round 7, given the data vintage of December 31, 2012, we began this process in December and the last submissions were accepted in March 2013.

While we continue to successfully engage the majority of providers in each round, the amount of manpower required to solicit complete and timely responses should not be underestimated. This process is one of the most costly and complex within the entire SBI program.

[2]The list of known providers and important submission statistics are contained in the datapackage.xls file.

Third Party Data Used

We have acquired the following commercial/restricted use data products:

- American Roamer, Coverage Right Advanced Services (tabular). This data served two purposes. The first was to verify the provider list and help find Broadband service providers not on other lists. The second was to verify the reasonableness of the Broadband service provider's submission.
- GeoResults Wirecenter Boundaries. This data was used in the verification of 'telephone' Broadband provider data. Where a public domain exchange boundary wasn't available, the boundary was used for coverage containment tests.
- Media Prints Cable boundaries. This data was used in the verification of Cable/HFC Broadband provider data. It was used to research valid providers and discover if that provider was offering Internet service.
- FCC 477 restricted use data were analyzed to find valid providers within a given area.
- Proprietary Provider Serving Areas. Since the first survey, a number of providers have supplied their engineering, serving area and/or franchise boundaries. We have maintained and enhanced these proprietary data sources.
- Towercoverag.com. This site offers a web mapping service to fixed wireless providers, many of which meet the criteria for our program. Providers can indicate through this site that they want to share their information for use on the NBM. In addition to using the site for provider validation purposes we pull mapping data for providers doing business in our state. In most instances we have found it necessary to contact the provider directly to get a complete and accurate submission of information for SBI.

We have included third party data sources which touch on each of the three major technologies analyzed within the SBI program. Each of these data sources tie back to a public domain data source, which provides a cross-verification mechanism for the commercial data product.

Although there are a large number of third party licensed data sources available, we remain conservative in our acquisition plans. From our limited analysis we are concerned about the ability to cross-verify additional third party licensed sources against public domain data. Further, we are unsure of how we may be able to integrate another data provider's view of valid Broadband providers within the definitions used by the NOFA (e.g. Are they using an FRN/DBA identity view or a marketing view? Can the provider supply in a 7-10 day window? Are they facilities based or not?). This leads us back to a statement we made in a 'lessons learned' Webinar (April 2010) about exploring a consortia to lower the cost of data acquisition and allow multiple entities to peer review the quality and methodologies behind licensed data products.[3]

Beyond these commercial data sources, we used a number of public domain sources. These included:

Geographic Data Files

[3] We also suggested forming a technical standards committee and a consistent system for confidence reporting.

- US Census TIGER data[4]

Sources that helped isolate providers, identity management or provider service areas

- NECA Tariff 4
- State produced exchange boundaries
- Carrier produced wirecenter boundaries (sometimes proprietary to provider)
- FCC Coals reports (321/325)
- FCC FRN API lookup tool
- FCC/FAA Antenna Registration System
- FCC FRN Lookup Tool (plain text search)
- USAC High Cost FCC Filing Appendices

Sources that helped isolate anchor institutions

- USAC Grant lookup tool
- USAC High-Cost FCC Filing Appendices
- HRSA data warehouse
- NCES data lookup
- State managed lists of schools (K-12), post-secondary institutions and libraries
- List of museums, conventions, and visitors bureaus from www.onlineatlas.us
- In state relationships to key stake holders.

Finally, challenges exist when dealing with the inevitable conflicts between provider-submitted data and third party sources (public or commercial). There is no guarantee third party sources are more accurate or timely than the providers' own reports. Indeed, some third party sources are based upon different standards than those specified in the NOFA, perhaps making them less reliable than information collected directly from providers. At the very minimum, provider data has a lineage and temporal status that we can identify. A concern we have with increasing use of third party data is that we have no way to verify its quality or development methodology. Particularly in rural areas we are concerned about what third party data may reflect based upon what we assume to be a small sample of information.

In other words, we may hit a wall in which we can't determine how the commercial source derived its coverage conclusion. To us this means that third party data sources are beneficial, but represent a supplementary view, not an authoritative one, of the NOFA defined Broadband market.

In short, we have chosen to use provider data as the baseline. We will challenge provider reports when third party data shows major anomalies, when submitted data conflict with prior submissions or when a consistent volume of consumer feedback points to a potential error.

[4] Census data were derived from < http://www.census.gov/cgi-bin/geo/shapefiles2010/main>, Census 2010 files. Roads were derived from the county faces and edges file downloaded at the same location and tiled for a full state.

Confidentiality and the Use of Licensed Materials

As a mapping vendor, we are reliant upon the cooperation of Broadband service providers. In large part, what underlies this cooperation is trust that we will not violate the proprietary and confidential nature of the data provided to us.

We are thankful for the confidentiality clarification that NTIA shared with us (included as Appendix 3). We use this as a guiding document to help us communicate with providers about what information NTIA considers to be confidential. Our suggestion is that NTIA publish this, or something comparable, to ensure a consistent interpretation of the NOFA and how it guides NDAs.

As some providers are non-responsive to requests for information, or lack resources necessary to put data into NTIA compliant formats, we have fallen back to the use of commercial data sources in several places.

For incumbent telephone providers we have used commercial wirecenter boundary products to filter Census Blocks and segments that are clearly out of their exchange areas. For cable providers we will use an estimate based upon Census Designated Places within MediaPrints named areas.

Public Engagement: Crowd Sourcing, Surveys and Social Media

Crowd sourcing (i.e., an intentional and carefully designed effort to tap into the collective intelligence of the public at large to expand our knowledge base) continues to be an important element of our data collection and validation process. An expanding use of social media is also an important strategy in our efforts to promote the programs overall and engage more citizens in the work at hand. To that end we offer various opportunities for the public to provide input via the online service coverage maps and the related 'Broadband story' process. These opportunities along with assorted public surveys have provided important information for the broadband effort in our state. As previously stated we see worth in engaging the public in this program and have found value in using social media outlets such as Facebook and Twitter to advance our process.

Consumer Surveys

Consumer surveys funded by the SBI grant have been hosted in our states over the course of this program. Many of which will be repeated over the remainder of the program by instate partners to establish and evaluate trends. The resulting data is helpful on a number of fronts in the SBI's mission to advance the access and adoption to Broadband. Survey data provides an important, albeit broad, gauge for assessing coverage information obtained by providers. For example, areas with widely available coverage (according to provider information), but lower consumer subscription levels (according to survey results), or perhaps where survey results suggest Broadband is not available, can be examined in more detail. Survey results are also very important to the broadband planning (and capacity building) components of the SBI program in that they help inform and formulate Broadband advancement priorities. Survey results also help inform Broadband policy discussions on both the local and state levels. Finally, survey results provide important information to the service provider community regarding market demand and Internet use in specific communities (i.e., regions).

Social Media

The phenomenon of social media is widely documented and is emerging as an effective access point for public engagement. We continue to explore appropriate ways to use a variety of social media venues in our SBI efforts. All of our efforts are informed by and consistent with relevant state statues and guidelines. Each state has a different perspectives on if and how the state will participate in the use of social media. Some state requirements are well defined and some are still being formed. Where appropriate, we use LinkedIn, Facebook and Twitter to support our work. A central focus is on promoting awareness of the program and seeking to expand engagement. In some situations we find that sub-program initiatives (e.g., regional planning teams) are making very effective use of Facebook to help inform and engage citizens impacted by the SBI program. In addition, we continue to evaluate how Facebook and Twitter can be used to drive public input on two important crowd sourced issues: online speed tests and input on map accuracy. Based on data obtained through our web site traffic monitoring process and readily available social media tracking processes, results are promising.

Capacity Building and Transitioning to State Partners

A fundamental goal of LinkAMERICA has always been to transfer knowledge and capacity to our in-State partners.

Within each State, transition planning and responsibility for specific activities is on a slightly different timeline. Much of this is driven by resource availability and partner identification within the State. For example we began transitioning the responsibility for Community Anchor Institution data to the State of Alabama in Round 3, starting with the use of interns to validate Community Anchor Institution data. In Round 4 the state's responsibility expanded to include collection of all CAI data, and in Round 5 the effort culminated with Alabama assuming responsibility for the CAI submission. LinkAMERICA supported this process with detailed transition documents and technical support. Alabama is continuing e the transition process assuming responsibility for the state website in the first Quarter of year 4 and is on track to assume hosting responsibility of the state map by Quarter 2.

In Idaho the SBI Framework Coordinator took on the responsibility of reaching out to CAIs in round 5. Since that time he has been working on a new outreach tool to enhance the data collection effort. Idaho, Wisconsin, and Wyoming are all working toward the goal of taking on responsibility for hosting the state map and website by the end of year 4. LinkAMERICA is providing support for this progression in each state with program leadership, technical assistance, tools, and project plans to ensure a smooth transition process.

Data Sharing With Other States

Where possible, LinkAMERICA works to share data with other state mapping entities. This data exchange tends to take two routes.

First for wireless providers if we find a fair amount of coverage that crossess into an adjacent state, we will ask the provider's permission to convey this information to the neighboring states. If the permission is received, we send the data to the mapping agency.

Second, in circumstances where we receive a speed that is outside of the technology speed 'norms' and this provider offers service in another state we try to check with other covered states to find out if the service is comparably marketed.

Trends in Submitted Data

Overall we note several important trends in this data submission. The list below represents general trends and not a scientific survey.

We note the following trends:

Activity from the FCC regarding the Connect America Fund has influenced the activity of providers and policy makers. In late December 2012 questions regarding coverage, partial coverage and updating to the round 6 maps took on much importance. This particular Public Notice generated a number of complex and ambiguous questions. We tried to assist users as best we could within the constraints of available time.

The coverage of advertised speeds is increasingly important. More and more providers are specifically concerned about where the submitted NTIA footprint shows available of 4 x 1 Mbps or 6 x 1 Mbps service.

Large national providers are beginning to submit block level speed information. In round 7 Windstream submitted block level coverage and speed. Other national Wireline providers, are more carefully reviewing the submitted coverage to ensure that it is consistent with their expectations.

xDSL speeds are increasing. More and more xDSL is likely ADSL 2+, VDSL, shortened loops, pair bonded or some combination of these. As we talk to providers who trigger speed/technology tripwires, we receive more and more feedback about the presence of these new technologies to enable speeds comparable with DOCSIS systems.

DOCSIS 3 is becoming the norm. Most cable systems are becoming DOCSIS 3.0. Over time we are seeing the DOCSIS 2.0 areas diminish. In some DOCSIS 3 areas there tend to be pockets of non DOCSIS 3 in predominant DOCSIS 3.0 markets.

There seems to be an increase in acquisitions among fixed wireless providers. Sorting out the acquisitions and territory abandonments has been complex and time consuming.

Fixed wireless providers are offering broadband services approaching 1 Gbps. This is occurring both in terms of licensed and unlicensed spectrum. Part of this is driven by where a provider has fiber or high capacity wireless backhaul but we are receiving more and more information from providers and radio manufacturers specific to very high speed wireless services. Although the service can be deployed

within the 7-10 day NOFA window, these higher speed services tend to be purchased by high capacity customers. It may be worth reconsidering the speed norms in this category as well as adding a field in the data table to indicate when a speed value is geared toward a specific end-user class.

There is less and less of a distinction between fixed wireless and mobile wireless. As firms market LTE and/or WiMax as home DSL alternatives we are a bit unsure how these two classes are to be established-what is the operating distinction between Transtech 80 (mobile licensed) and Transtech 71 (fixed licensed) when both are used as in-home Broadband service?

Satellite providers are advertising broadband services comparable in speed to xDSL. Some satellite spectrum codes are not available for use in the data model. Some satellite providers are beginning to indicate a difference in speed within the states. We are working with providers to clarify this new type of submission.

We continue to see a number of national Broadband providers who do not show broadband coverage within pockets of otherwise covered areas. In the figure below, the orange represents Census blocks which are NOFA broadband covered. The transparent areas have no NOFA broadband coverage from the same provider.

Figure 1--Uncovered pockets within urban, covered areas

This coverage drop-out appears to be happening in urban Census blocks typically with schools, shopping malls, universities and large businesses. We don't know why this is happening, but it could be an impact of the NOFA restriction on 7-10 provisioning. This is a noticeable artifact in the data and does challenge the notion of some who see NOFA compliant Broadband coverage as a uniform surface across an area.

We see a pattern of some providers clipping their coverage to reflect what we believe are license boundaries. Although the coverage clips have been apparent in the past, they appear more abrupt in this round.

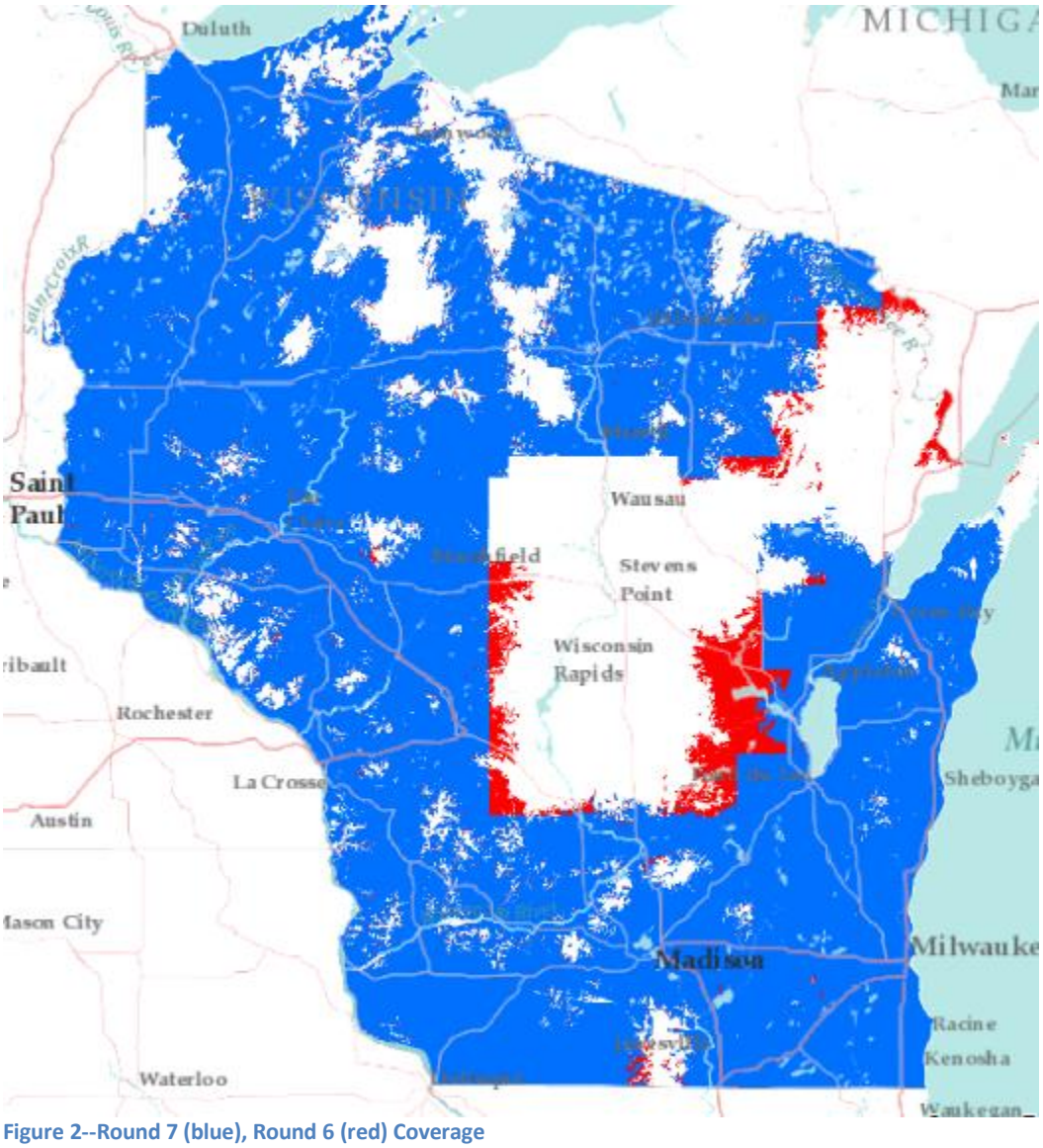


Figure 2--Round 7 (blue), Round 6 (red) Coverage

Data Production Process

To support our objective of transitioning the data development process to our State partners, we continue to model, refine and document our data production process. We find this to be a very beneficial step for two purposes.

First, it helps us understand why (and if) a task is being done, and if it is being done efficiently. Much of this program started so quickly that it was difficult to plan logical integration and hand off points among the various workgroups. Further, we are currently in the process of consolidating much of the process data (check-ins, check-outs, metadata) and we can use this process model to efficiently plan cohesive information architecture.

Second, our process documentation and modeling helps explain why resources are being consumed in a particular way. This helps our State partners plan for in-sourcing specific tasks as their time and budgetary constraints allow. It also helps our LinkAMERICA team better plan and cross-train members to deal with the work surge that occurs 30-45 days prior to submission.

Finally, documenting and modeling our process helps us to take advantage of increasing specialization and proficiency with certain types of data and management responsibilities. In submission 3, we had identified data "czars" responsible for check-in and check-out of data. That data czar helped to bridge the gap among receipt functions, provider feedback, production and DBA. In round 5 the data czar was also tasked with alerting on speed/technology tripwires. This individual was responsible for taking the initial review of each submission and determining if an NTIA speed/technology warning would be triggered.

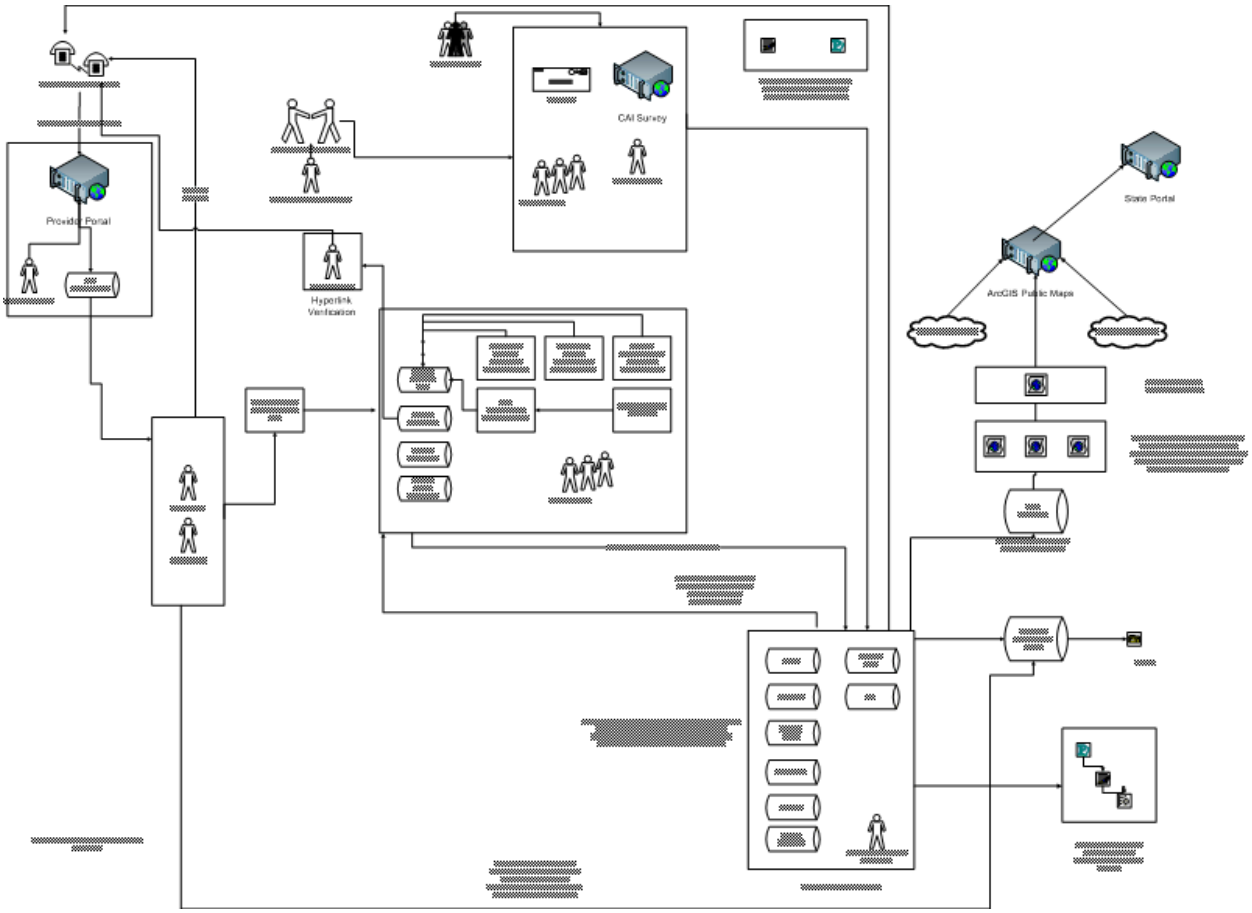


Figure 3—SBI Data Development Business Process Diagram

Provider Tracking In the Cloud

Prior to initiating the Round 5 survey, LinkAMERICA transitioned in house provider tracking systems to a Cloud based application, TrackVia.

The movement away from desktop solutions was based upon several factors. First, the architecture these systems were designed under no longer met the program realities. For example, deliverables like Datapackage.xls were not contemplated when the original provider tracking system was developed. Second, the ability to share data across multiple geographic areas and organizations was becoming increasingly important as the program evolves and responsibility moves to in-State partners. Third, portions of this data need to securely transition back to State resources who may or may not be able to support a specific IT infrastructure. These factors combined to make the Cloud applications a valuable alternative.

As with any IT transition, the process has not been without challenges. Nonetheless the investment in time and resources has proven to be effective and worthwhile. We anticipate further movement away from desktop oriented architecture to a more open, Cloud type solution.

Data Production Methods

As raw data were received from the provider community, attention turned to normalizing the disparate submission formats[5]. The team considered each submission with respect to the following criteria. These criteria are important because they perform the basis for our verification and quality assurance process. In other words, we have to appropriately scale our data verification efforts to match the scale or ambiguity of the following:

- Locational certainty
- Speed certainty
- Temporal certainty
- Provider and network ownership certainty

The team's goal was NOT to quantify a particular degree of precision with respect to any of these criteria. Rather, we are working to attribute the above "certainty attributes" to each submission, and will continue to implement quality assurance and verification mechanisms that are resource-appropriate for each.

Deriving Broadband Coverage Information

Broadband Coverage[6] was normalized into four formats:

1. Coverage in Census Blocks (2010) of 2.00 or less square miles
2. Covered Street Segments (2010) in Census Blocks greater than 2 square miles[7]
3. Address Level Coverage (point data)
4. Wireless Service Areas (SHP file format)

With each submission, the team went through a series of steps to normalize and categorize the data. Since data arrived in many different formats, and at many levels of granularity, the following normalization procedures were used:

- Determining the nature of service being provisioned (who is providing service and what technologies are in use)
- Planning an attack strategy for the submission –understanding the data and assigning team members to various tasks
- Alert provider relations staff if the received data trigger an NTIA speed/coverage tripwire.
- Georeferencing the data; QA the georeferenced data
- Geoprocessing the geo-referenced response

[5] In line with NTIA Best Practices we continue to request and receive a large number of data input formats. This ranges from tabular block lists to hand drawn maps.

[6] Speed, Anchor institutions and Middle Mile facilities are discussed in later sections.

[7] To help clarify issues relating to Census block area and vintages in use, our team published a technical paper to the Grantee workspace. Because we were unsure if this standard should be implemented uniformly, this document was never distributed to the provider community.

- Segregating the submission into the correct NOFA-compliant submission formats.
- Apply appropriate source metadata[8]

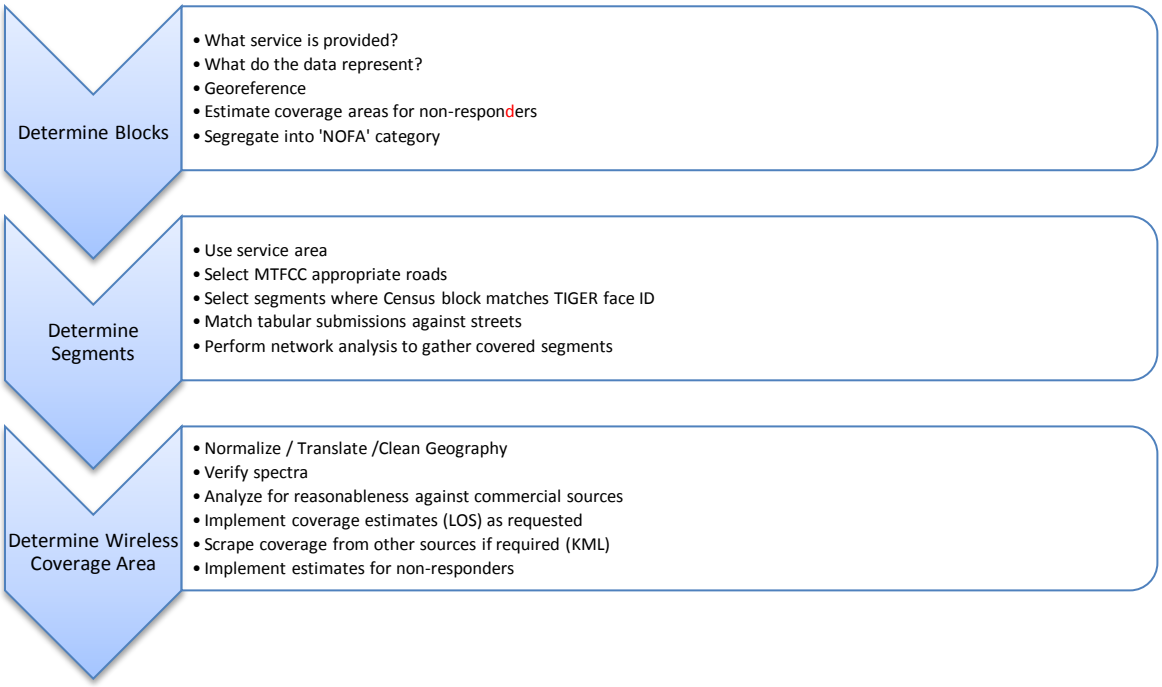


Figure 4-Components of Broadband Coverage Process

Impact of Program Change

There were several important program changes that impacted how Broadband coverage was developed and submitted to NTIA in Round 7.

Speed Examination

Given recent concerns about the depiction of speed and what that mapped speed represents, LinkAMERICA invests considerable time requesting detailed information on speed which appeared to be beyond normal speeds for a given Technology of Transmission given the NTIA supplied frequency tables.

Based upon these conversations we learned

A) For incumbent telephone providers; the speeds beyond the normal xDSL range represent significantly shortened copper loops, as well as upgrading DSLAMs and modems to support ADSL2+ or VDSL.

B) For cable providers the intermixing of DOCSIS 3.0 and non 3.0 systems in a market area is typical and sometimes reflects a circumstance where segments of plant cannot be upgraded to DOCSIS 3.0. This variance can be at a level below the Census block. In these cases the maximum advertised speeds

[8] When our team logs a submission into the staging database we record at least two attributes. One records the method used to derive the coverage, the other records the method by which speed was attributed to that object. Other attributes carried to NTIA carry source meta values as well.

remain to represent the market area but the plant variance is typical. We also have one 'cable' provider who is delivering DOCSIS 2.0 over fiber plant (RF over Glass or RFog).

C)There exists a fundamental disconnect between some providers reporting a service qualified speed--the maximum speed available at a structure versus other providers submitting their maximum speed at the market (MSA/RSA level). Both submission paths are available to providers but the likelihood of providing a speed incompatible with a technology is much greater for providers submitting market level speed. For the most part, wireline providers are submitting block level speeds. This creates a fundamental disparity between the wireless speed reporting between wireless and wireline providers.

D)Fixed wireless provides are using new radio technology to quickly deploy services which rival and sometimes exceed those of wireline service providers. These speeds are being advertised, sometimes on public facing websites as well as using direct field sales staff to target specific high demand customers. These services are actively marketed but they challenge the data model in that the speed is marketed and available within 7-10 days of request but the nature of the fixed wireless submission forces attribution of this speed within a potentially large geographic area.

E) There exists a minority of providers who submit a theoretical speed that is unmatched by their web advertising. In these cases we request clarification from the provider on the inconsistency. Our experience has been that providers will modify the speed to be consistent with their marketing and advertising.

F) The maximum advertised speed offered is not always clear. Sometimes the speed is described in advertisements in terms of a combination of video and data. Other times it is data not video. Some providers allow a customer to select how much bandwidth they want to allocate to their data stream versus video stream. In other words the bandwidth available to a household is constant but how it gets allocated among the data versus video becomes a customer or service directed choice. This makes getting Maximum Advertised Downstream speed very difficult because it is not just a product of the broadband network which we are mapping but also the customer's selected service package. Upstream is rarely advertised. Different marketing channels (Business to Consumer versus Business to Business may yield different marketed speed combinations.

Provider Definitions

Within our provider verification process we work to derive a state level provider match against third party data sources. As discussed in the early pages of this manual, there is no guarantee that a third party data source is any more accurate than submitted data, nor does it necessarily reflect the provider ecosystem specified in the NOFA, Technical Appendix A. We devote significant resources to matching our submitted data against outside data sources. In many cases this becomes a judgment call trying to match provider names across systems. It is a difficult and somewhat arbitrary process. Nonetheless we

do believe it has value because it forces a re-examination of who we believe is an appropriate provider within a non-NOFA context[9].

The use of a provider match system, as well as the webinar comments (3/17/11)[10] directing grantees to estimate, wherever possible, non-participating providers have made us back away from one of our fundamental assumptions in data collection. As discussed in prior versions of this manual, we had developed a certain "hold-out" class of data when a provider's data wasn't of sufficient quality to verify, or we were unable to put it into the data model (e.g. address points submitted for fixed wireless). In submission four, much of this hold-out data was included[11]. In some cases this involved using simple polygons to capture a wireless ISPs serving area. Other times, if we are confident in the coverage, but can get little clarification on the submitted speeds or frequencies, we release the coverage and note in our internal metadata the source issues with the other attributes.

In the weeks leading to submission 5 we received a request from NTIA to clarify the presence of unusual shaped wireless polygons. Our interpretation of this was a request for information relating to the source of these data which do not appear as propagated coverage. Although the 'unusual shapes request' represents a very small portion of the submitted data, it begs an important question about the expectations with respect to wireless coverage patterns. We look forward to working with NTIA to address these issues in a fair way across States and providers. We would not want to create a coverage dichotomy where advertised coverage was disallowed from the NTIA submission because of an expectation about how advertised coverage should appear. One concern we have when we develop a coverage estimate which differs from a providers advertised coverage pattern, which should we submit? As of the current round, this remains an open question.

Finally, we use the provider type classification of 'other' to bring specific aspects of certain provider's data into our submission. There still seems to be confusion on how to handle provider types where a provider offers multiple paths to provision Broadband for typically business customers. Rather than waiting for certainty on the answer, we bring the provider in and list them as provider Type "other". Our sense is provider Type "other" will continue to expand in subsequent submissions.

Clearly one challenge is the data, but an equally significant challenge is appropriate messaging around this "other" provider type category. We do not want to leave consumers with the impression that they can get a high capacity fiber or microwave link despite the fact that the hospital next to them or in a nearby Census block can get this service.

[9] We have requested from NTIA information on how provider matching is done within their QA process; beyond the relatively short whitepaper posted with the national map <http://www.broadbandmap.gov/blog/wp-content/uploads/2011/02/DataComparison_Methodology2.pdf>, we have not received any more detailed information on how providers are cross verified between submitted and third party sources at the national level. Our understanding is licensing concerns are holding the release of this information.

[10] Clarifying comments from Akins Lawl indicate the Program Office does not want Satellite providers estimated if the provider is non-responsive to data requests (email 9/12/12).

[11] We continue to process older submission data looking for information and methods by which we can estimate coverage information. This will be an ongoing process.

After the April 2011 Grantee conference, LinkAMERICA submitted a paper describing our provider classification system[12]. It is our feeling that understanding the type of provider is essential to appropriate verification methods.

Coverage Geoprocessing Methods

The next section discusses how data were georeferenced and geoprocessed given a particular submission format. We have yet to find a particular method that works across all submissions. Rather we tend to tailor our geoprocessing to meet the specifics of the service provider and data submitted.

In most cases, in Round 7 we were not provided with street segment geographic objects for Blocks greater than two square miles (large Blocks). This necessitated subsidiary geoprocessing. As stated before, our first goal was to derive block level coverage. Then, for Blocks greater than 2.00 square miles, we moved to a segment gathering processing. The segment process will be described in the last section.[13]

Block Level Coverage Derivation Using Service Point Data

A number of providers submitted point level customer data.

In some cases the submissions themselves were not internally consistent. For example, in the image below, unprojected points are shown, while the Census block polygon to which the points are supposed to "belong" is highlighted. In this case, one of the following scenarios has occurred: block attribution is wrong, the points are not in the location to which they are attributed, or different block shapes were used than what is assumed.

[12] https://sbdd-granteeworkspace.pbworks.com/w/file/42309493/provider%20ClassificationFINAL.docx

[13] As has been discussed previously, we note inconsistency in how providers are supplying information at the block and segment level. Beyond the temporal differences, we see that providers are computing area differently, as well as including or excluding water areas. This provides an inconsistent measure across providers for the 2.00 sq mile cut off. Our preference would be to provide guidance to service providers within our states, but our concern is that we will inconsistently message this with grantees in other states. We would appreciate consistent guidance from FCC/NTIA on this topic.

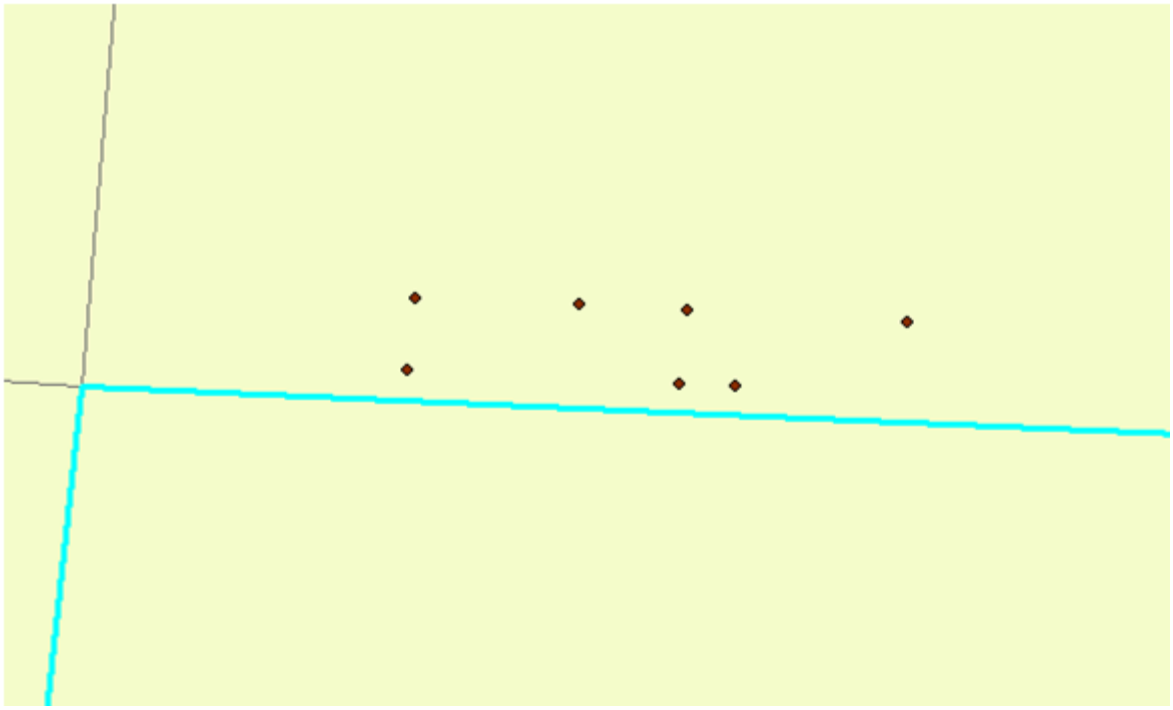


Figure 5-Internal inconsistency in submitted data

In other circumstances, we found that inconsistent geocoding standards may produce misleading results. The next image shows point level data, and the Blocks are colored based upon the counts of points intersecting Blocks. The challenge this presents is that if geocoding was performed on a different dataset than the block boundaries (the road traces are not coincident with block boundaries) and/or geocoding was done without an offset, it becomes problematic to assign coverage to a Census block based upon only the point locations.

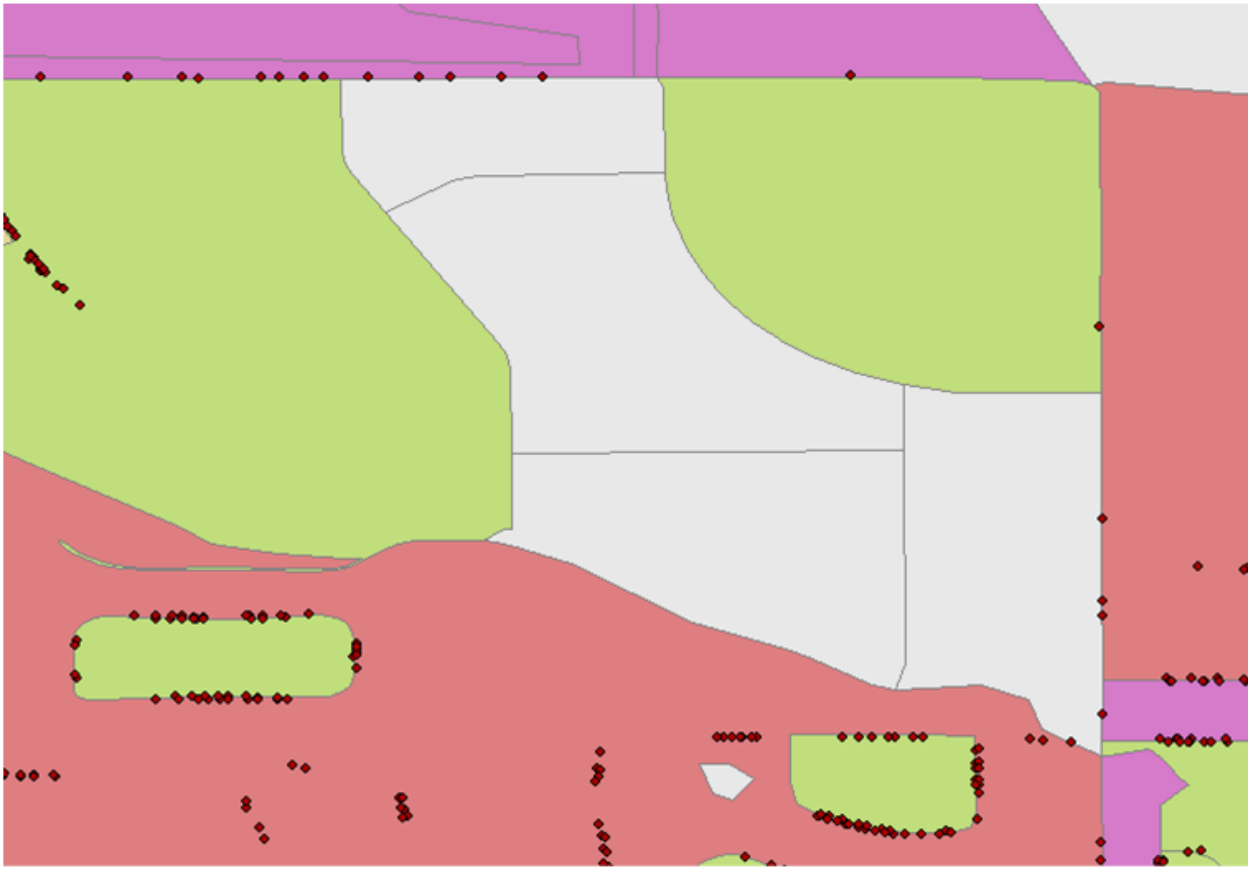


Figure 6-Block Coverage

For this reason, where we were provided address point data and asked to generate covered Census blocks, we elected to use a 200-foot buffer to select Census Blocks that intersect our points.

We also see a number of providers submit customer data and facility data. Their intent is to allow us to have two primary sources from which to derive the most accurate coverage. In these cases we tend to look for clusters of customers in areas where we see no facility based coverage.

With respect to deriving Block level speed from sub-Block data, we have instituted a business rule where the predominant speed in a Block is the speed we attribute to the Block.

Block Level Coverage Derivation Using Customer Facing Plant Level Point Data

In other circumstances, providers submitted point level plant data. From what we could gather, these points tended to be customer-dedicated terminals. Typically, these providers were high speed Broadband producers—which may somewhat strain the definition of Broadband as other providers supplying comparable services specifically disclaimed the ability to provide high-capacity Broadband services in the required 7-10 day interval. In these plant point data submissions, we had similar concerns to the point level customer data, but two factors tended to make us use a more conservative intersection buffer. First, we tended to have far fewer points to work from, so our concern was grabbing too many covered Blocks as the Blocks tended to be much smaller in these urban areas.

Second, these plant points tended to be dedicated to distinct customers, but it was difficult to know which element of the customer's campus to attach coverage to.

In the case of the image below, given a small shift to the left, it would be easily possible to gather 1 to 3 Census Blocks from this point. Although orthoimagery is helpful in a circumstance such as this, it is still indeterminate.

Thus, in the circumstance of plant level point data, we used a 100-foot intersection buffer.

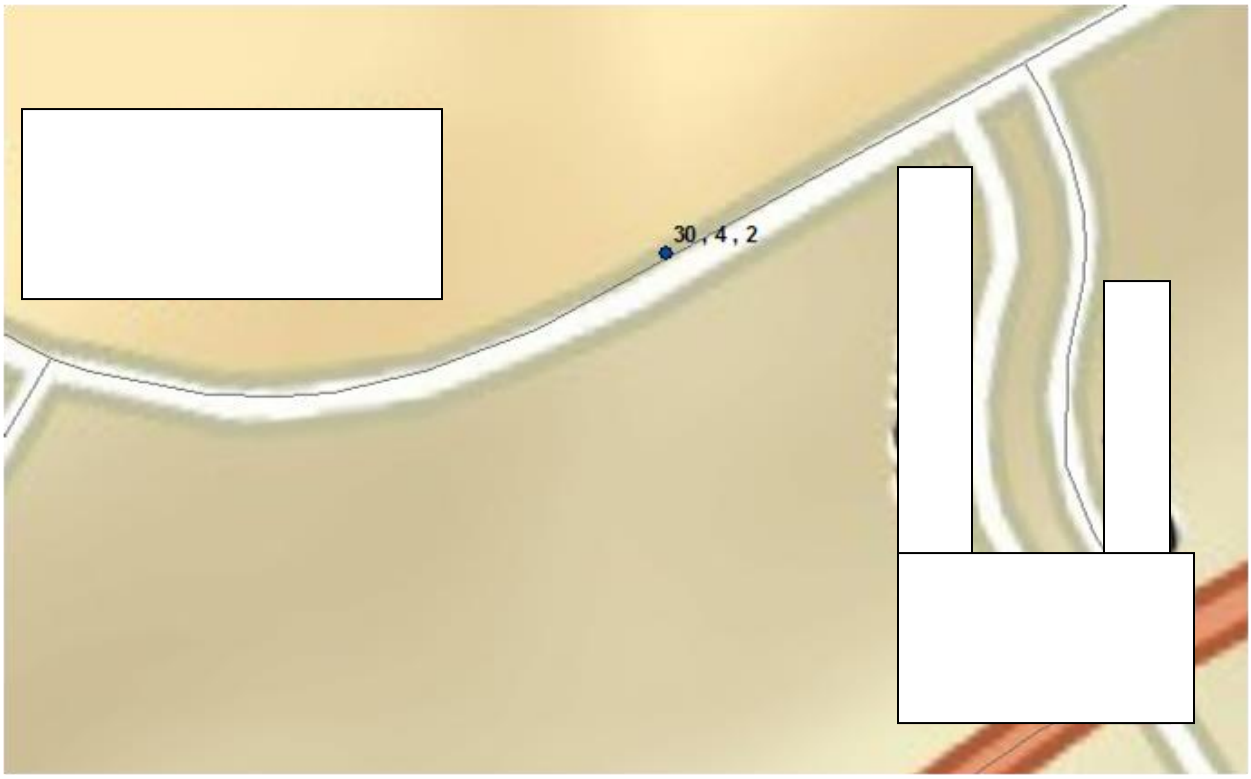


Figure 7-Plant Point level data

Coverage Derivation Using Linear Facilities Data

A number of providers submitted facilities data. We handled this data in different ways depending upon what we believed the facility data represented.

Most telecommunications networks are divided into two components. Feeder - supplies higher capacity nodes (eg. DSLAMs, Fiber Nodes). Distribution - usually supplies customer premises (NIDs, Pedestals, Taps, ONTs). Where we could discern what facilities we were provided, we used different methods.

The next image demonstrates a geo-referenced CAD image as given to us by a service provider. Note the light and dark green shading. We would infer that the lighter segments represent distribution and the dark green represents the feeder network.

In the case of a combined strand map, we used a relatively tight buffer of 200 feet to gather covered Census Blocks. Our intersection tolerance is based upon an assumption that our data likely represent a

situation comparable to customer point level submission in that we have most of the network footprint captured.

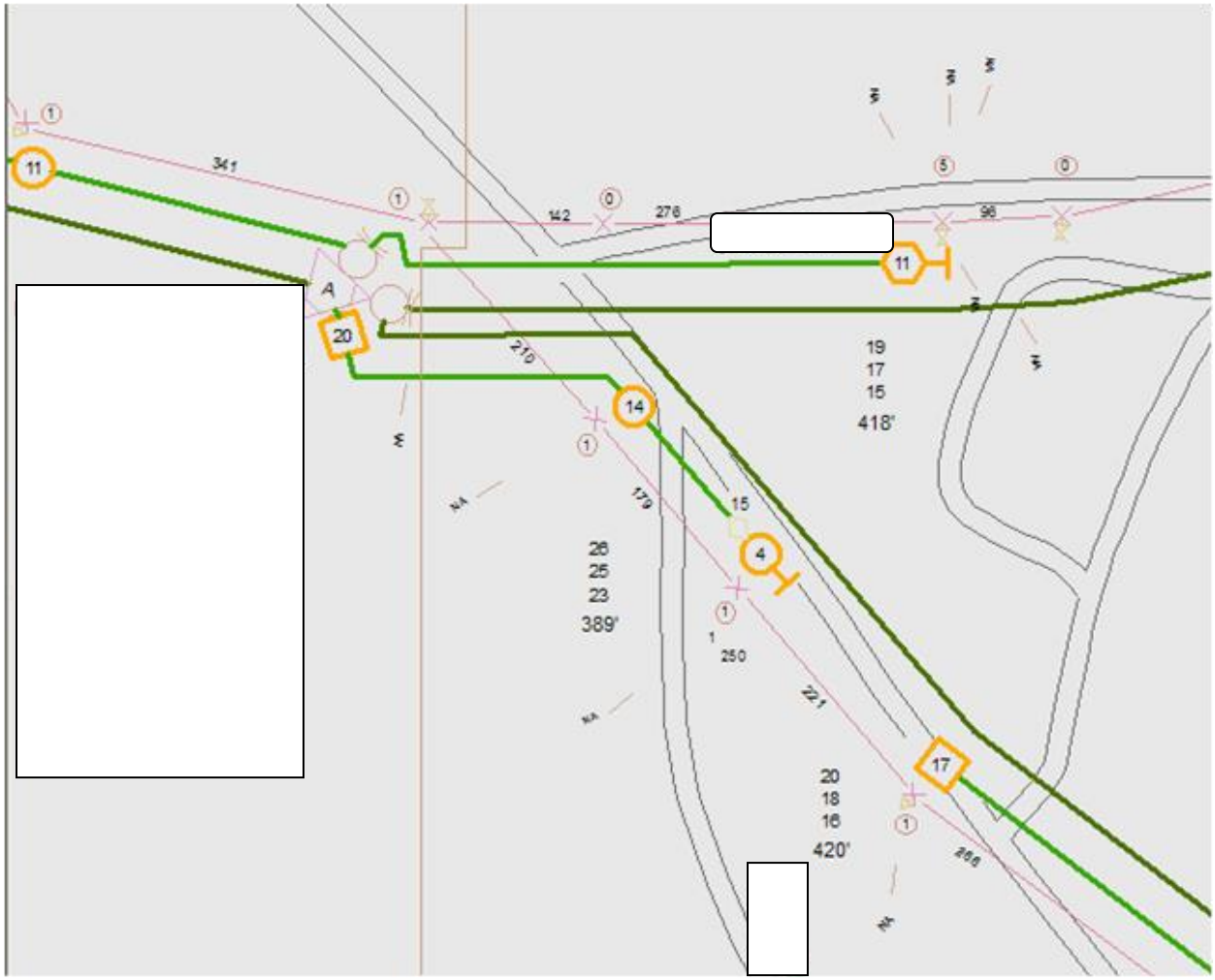


Figure 8-Georeferenced CAD information supplied by Broadband provider

In other circumstances, we were provided engineering information that we inferred to be feeder only. This inference was typically based upon the presence of fiber optic equipment only. In these cases, we used a more generous 2,000 meter Census block intersection. The 2,000 meter criteria was based upon an informal survey of population in proximity to the geo-referenced strand data, but it could be varied based upon a more complete survey.

Coverage Derivation Using Covered Street Segment Data

In some cases we were provided with covered street segment data. Covered segments tended to come from two sources.

In some circumstances, providers gave us CAD data, which was not drawn in a projected manner. This is relatively common for older engineering data derived from hand drawn records. This meant that our

team geo-registered the image into an approximate position. In this case, the boundary streets were selected, and an enclosing polygon was derived. The intersection of this polygon and the Blocks within became the geoprocessing method to derive Blocks.

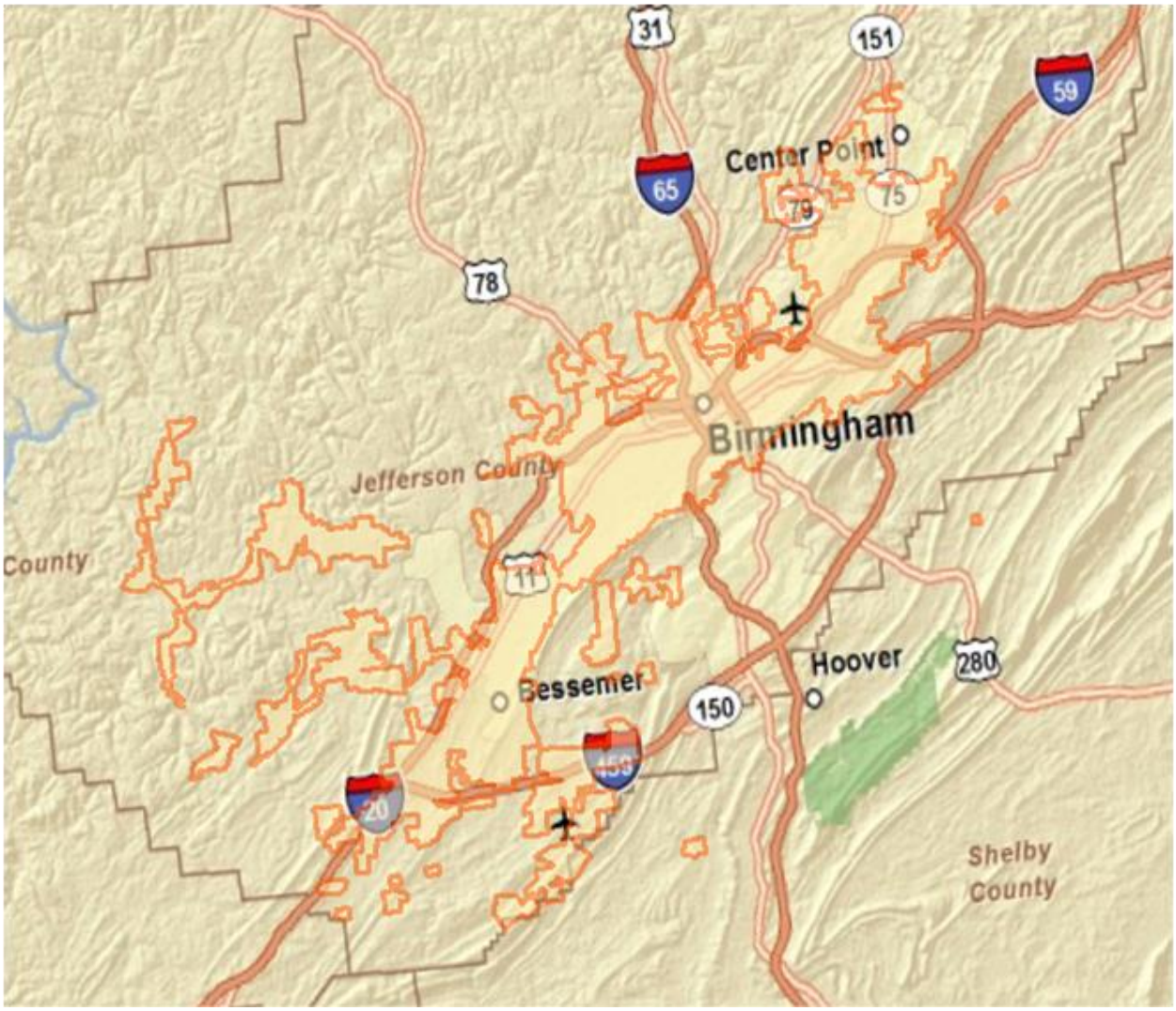


Figure 9-Coverage derived from street segments

In a second circumstance, street segment data was developed during coverage estimation. Handling the estimated data is discussed below.

Coverage Derivation Using Serving Area Point Submission Data

In other cases we worked with providers to derive service areas based upon point plant data. In these cases we were given a serving node and an appropriate road length service boundary. There is an important distinction from the plant data discussed above. In this specific case, the data submitted was a node that served many locations--such as a Central Office or DSLAM. This is contrasted with the earlier example in which the point represents a node serving only a few customers.

When trying to derive coverage from Central Office or DSLAM nodes, the team used ESRI Network Analyst to derive covered road segments honoring these road engineering parameters.

The figure below shows street level coverage derived from Central Office and remote DSLAM point data.

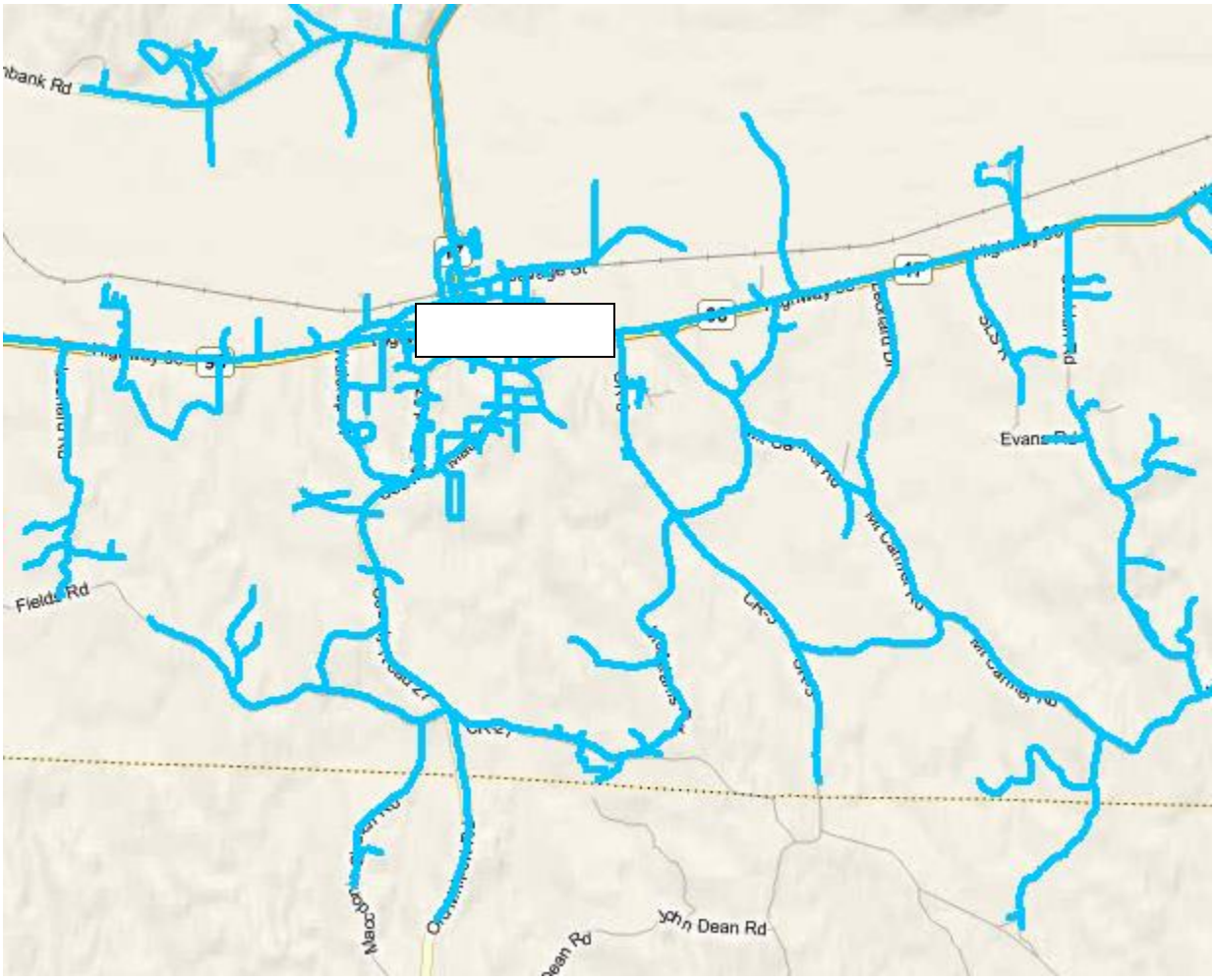


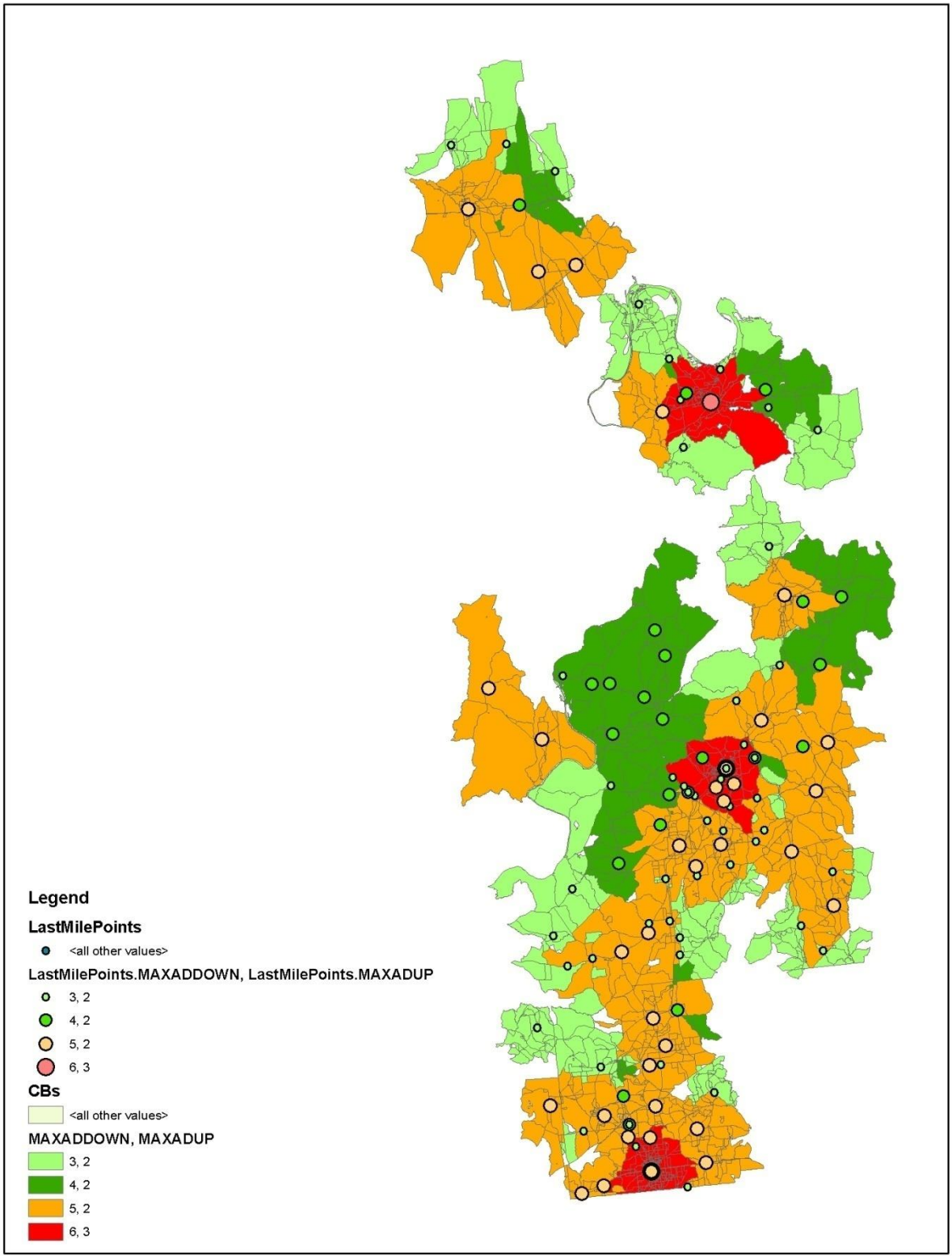
Figure 10-Coverage derived through road paths

In response to Provider feedback we revised this process to include a larger variety of TIGER road types. In Round 1, unimproved roads were not used. In the current submission -- particularly to improve estimates in areas bordering parks and public lands -- a wider class of TIGER roads was used.[14] We still get concerns from service providers about missing road segments and incorrect centerline appearance.

The segment level coverage is easily extendable to derivations of Census block level speed. The figure below shows the attributions of block level speed based upon the Maximum Advertised Speed available from a DSLAM. Although the methodology isn't perfect, it does provide insight into the value of granular infrastructure data.

[14] Only TIGER features of MTFCC type S1100 and S1200 were excluded from use.

Over time we have seen an increase in the number of providers submitting this type of data for our use. Our sense is some providers find plant level data easier to generate and are satisfied with the results of derived coverage.


Legend
LastMilePoints
<all other values>
LastMilePoints.MAXADDOWN, LastMilePoints.MAXADUP
3, 2
4, 2
5, 2
6, 3
CBs
<all other values>
MAXADDOWN, MAXADUP
3, 2
4, 2
5, 2
6, 3

Coverage Derivation Using Polygon/Polyline Serving Areas

Broadband service providers sometimes submitted coverage in terms of served areas. This was either in direct geospatial formats, CAD files, or paper maps. The image below reflects a carrier's service area. Within that service area, there are variations in technology of transmission and served speeds. When polygons with speed data and technology of transmission were available, we used a spatial intersection to gather covered Census Blocks. In many cases, using covered Census Blocks resulted in a loss of the speed variation (sometimes the speed variation was at a level smaller than a Block and did not get picked up within a spatial query).

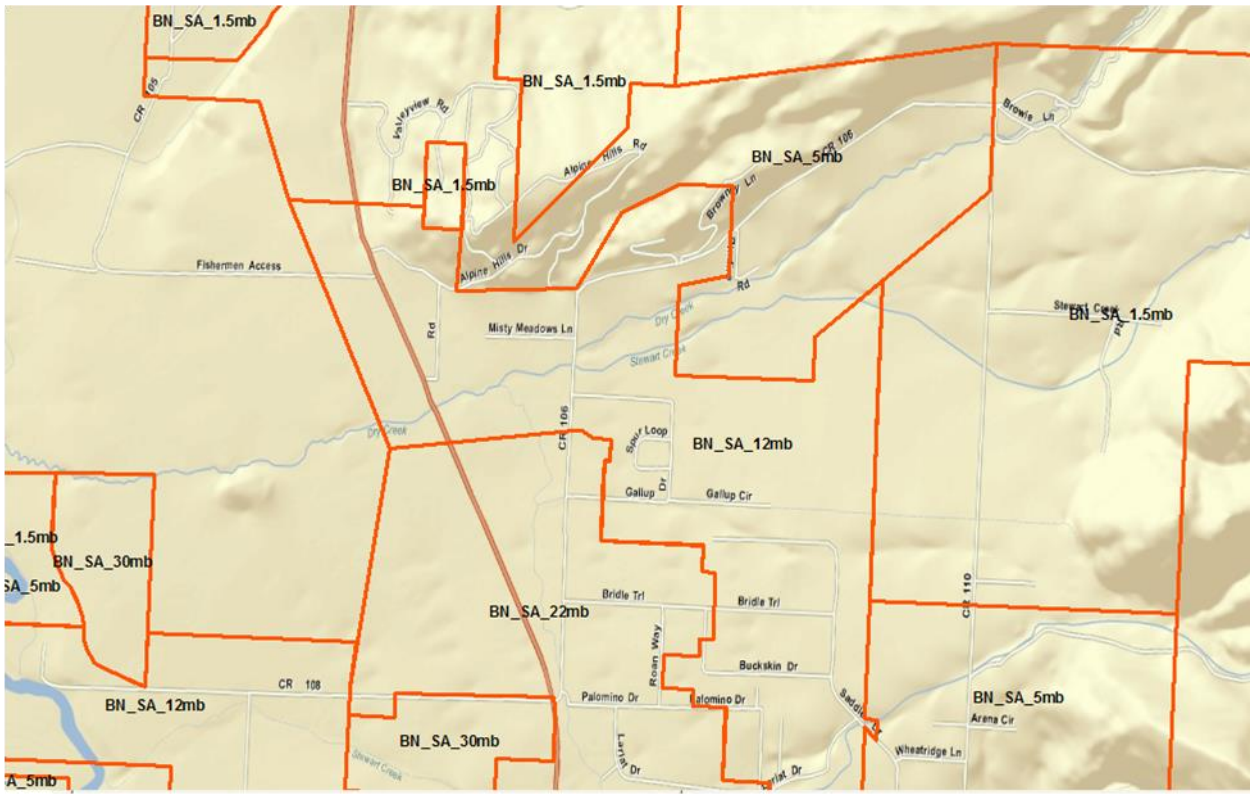


Figure 11-Coverage derived through serving area polygons

Although we cannot directly solve the loss of speed granularity due to Block shapes, we honor a business rule wherein we always select Blocks from the highest speed areas first, and then allow the lower speeds to select from the remaining Blocks. This is an arbitrary rule, but our feeling was that it should be a consistent selection, rather than an unordered selection.

Street Segment Derivation, Large Blocks

For those calculated Blocks greater than 2.00 square miles (large Blocks), we provided coverage in terms of covered street segments and corresponding geography.

With respect to segments we had four sources of data:

1. Covered large Blocks
2. Tabular street segments and address ranges for large Blocks

3. Geographic segments either with street attributes or without
4. Service area boundaries

A few providers only provided a list of covered large Blocks without corresponding segment information beneath the block. This provided the choice of either selecting all segments in the block, or none. Because we had little information from which to make the selection, we elected to be conservative and did NOT pass any covered segments to NTIA from this submission format.

Some Broadband providers submitted covered street names and street ranges. In these cases we performed a manual analysis trying to link to specific segment names and address ranges within covered Blocks. Sometimes this was a simple process because a provider used a TIGER derived street database. In other cases we could not determine the source of the provider's street data. Street and Address matching tended to yield a relatively good result (typically between 30% and 100% of possible segments in the Block), but was very time consuming. Where yield rates were low, our result was a shredded

segment coverage pattern, like the image shown below.[15]

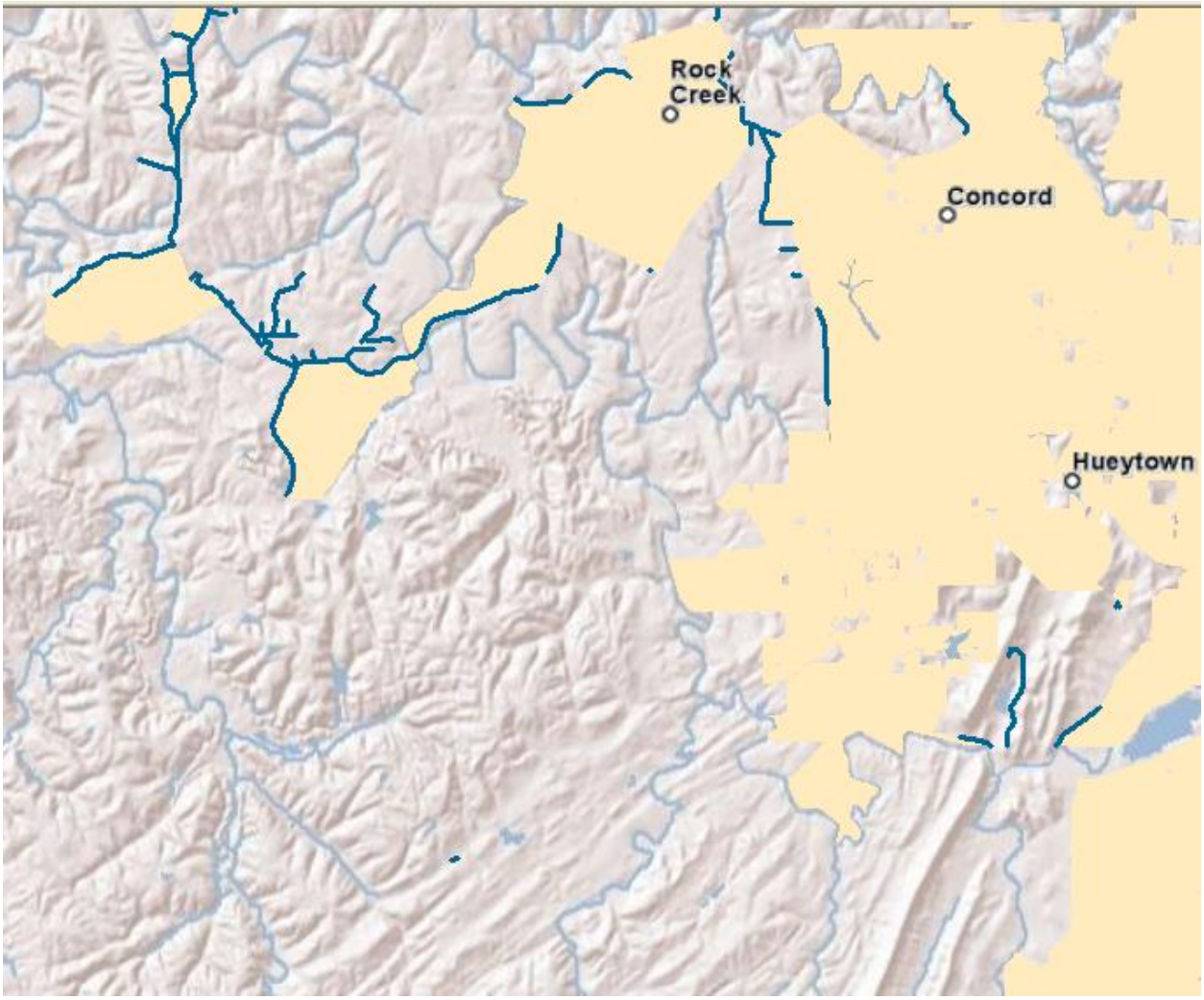


Figure 12-Blue road segments adjacent to peach covered small Blocks

A number of providers submitted geographic objects. In this case, our manual process was directed toward a conflation of data sources. The goal was to take provider submitted segments and put these segments in terms of our TIGER 2010 basemap. Although there is a trade-off in the accuracy using non-provider submitted segments, we felt it was more important to have a license-free road set that would edgematch our Block features, the TIGER state boundary and remain consistent with the block size standards we used for other providers. This is important for the appearance of the online maps, as well as potential verification work where we are attempting to judge a feature based upon its attachment to a covered small Census block. The figure below shows street segment input data.

[15] We continue to hear providers expressing concern that our request for either a geographic object or TIGER Line ID is beyond the scope of the NOFA clarification. Therefore, they cannot supply additional information to us.

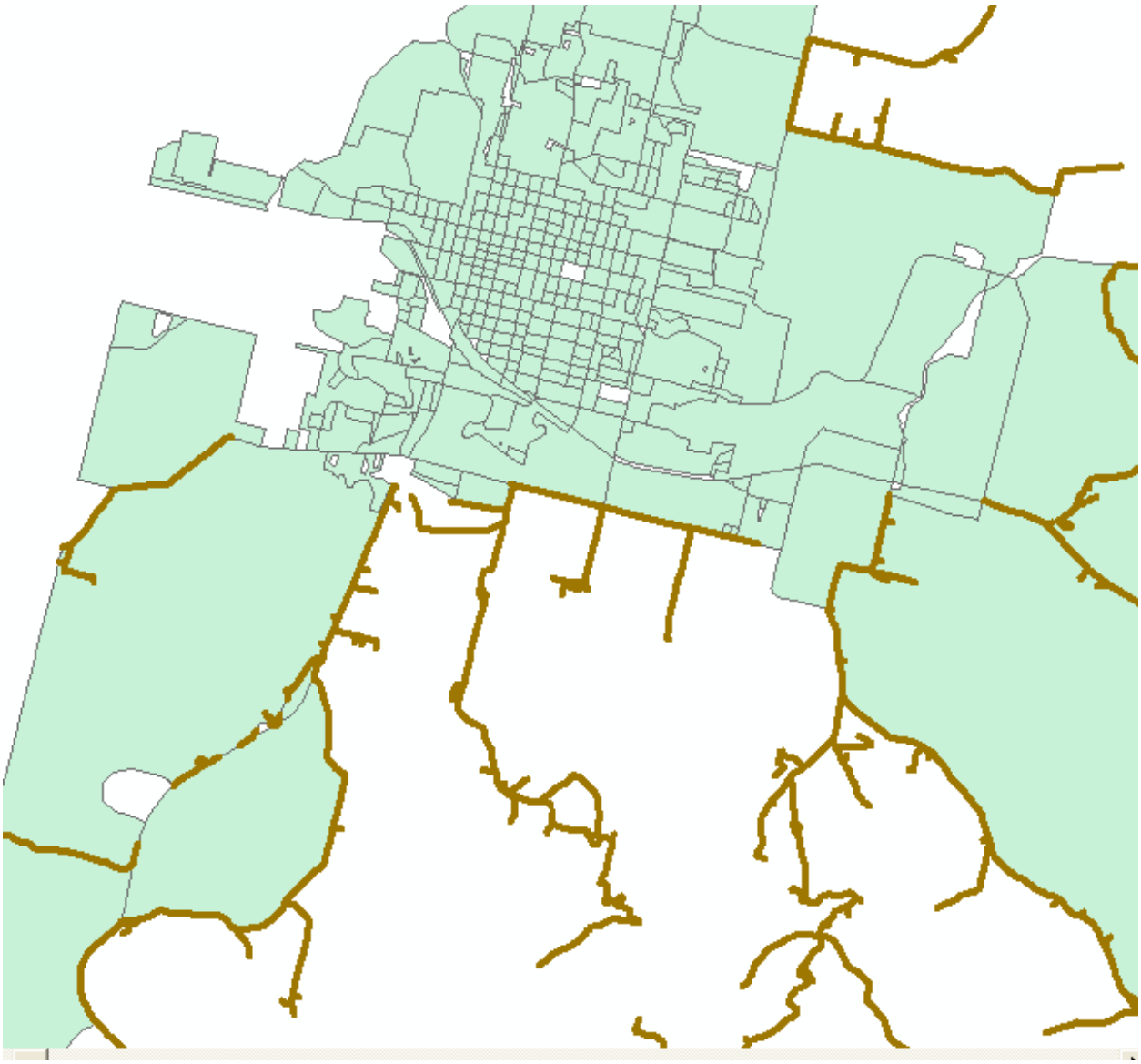


Figure 13-provider Submitted Street Segment Objects. The segments don't edge match the Blocks nor are they continuous.

The figure following demonstrates the same area after the conflation process. Blue segments are the conflated TIGER roads which will be passed to NTIA.

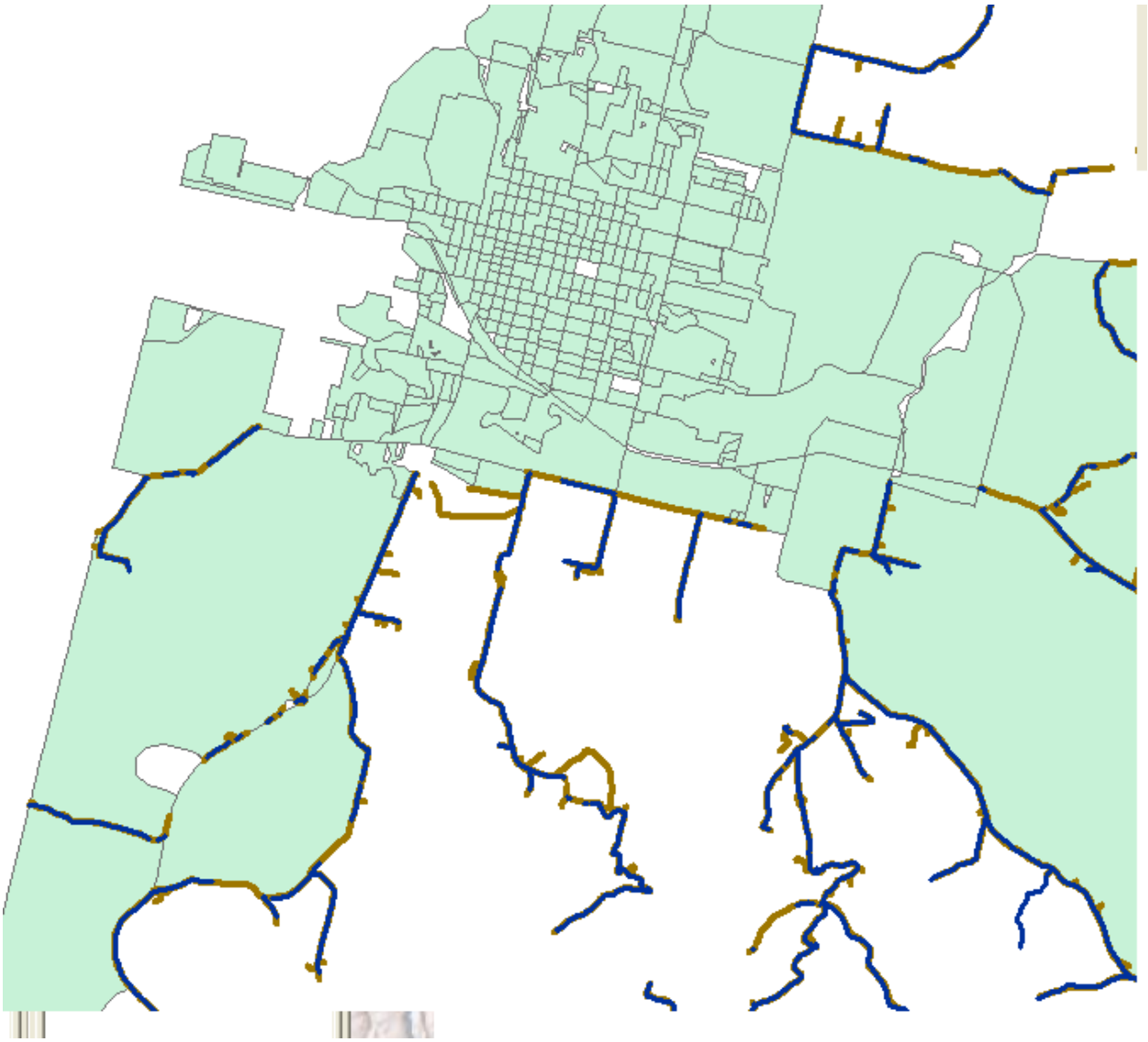


Figure 14-provider submitted segments in gold, selected TIGER in blue—Conflation result; in many cases what was a continuous segment is made discontinuous because even with a distance buffer the TIGER segment doesn't always intersect the provider segment

The final segment process was used when we were supplied with a Broadband covered area polygon. In this case, we found the segments within covered areas and eliminated those segments inside of Blocks less than or equal to 2.00 square miles.

Because there was more control over the format of the inputs (we knew we had a boundary and were working with TIGER segments), this was an automated process that followed this general format:

- Select large covered Blocks by provider ID (from updated Large Block table)
- Select TIGER 2010 road segments (MTFCC like 'S%') that face (CB = CBLeft2010 or CB = CBRight2010) covered large Blocks for provider

- Select segments as distinct records, max speed with corresponding technology, join in feature names, export selected records to temporary DBMS table
- Join TIGER roads feature class to temporary table on TLID
- Select covered segments (Python script)
- Select service area polygons for provider
- Clip selected facing segments with selected service area
- Export clipped segments to staging feature class, keyed by providerID

In this figure, orange represents covered small Blocks; black lines are covered segments in large Census Blocks (light blue). The service area boundary is shown in grey. Based upon feedback from providers, we have elected to clip segments at the end of a coverage boundary.[16]

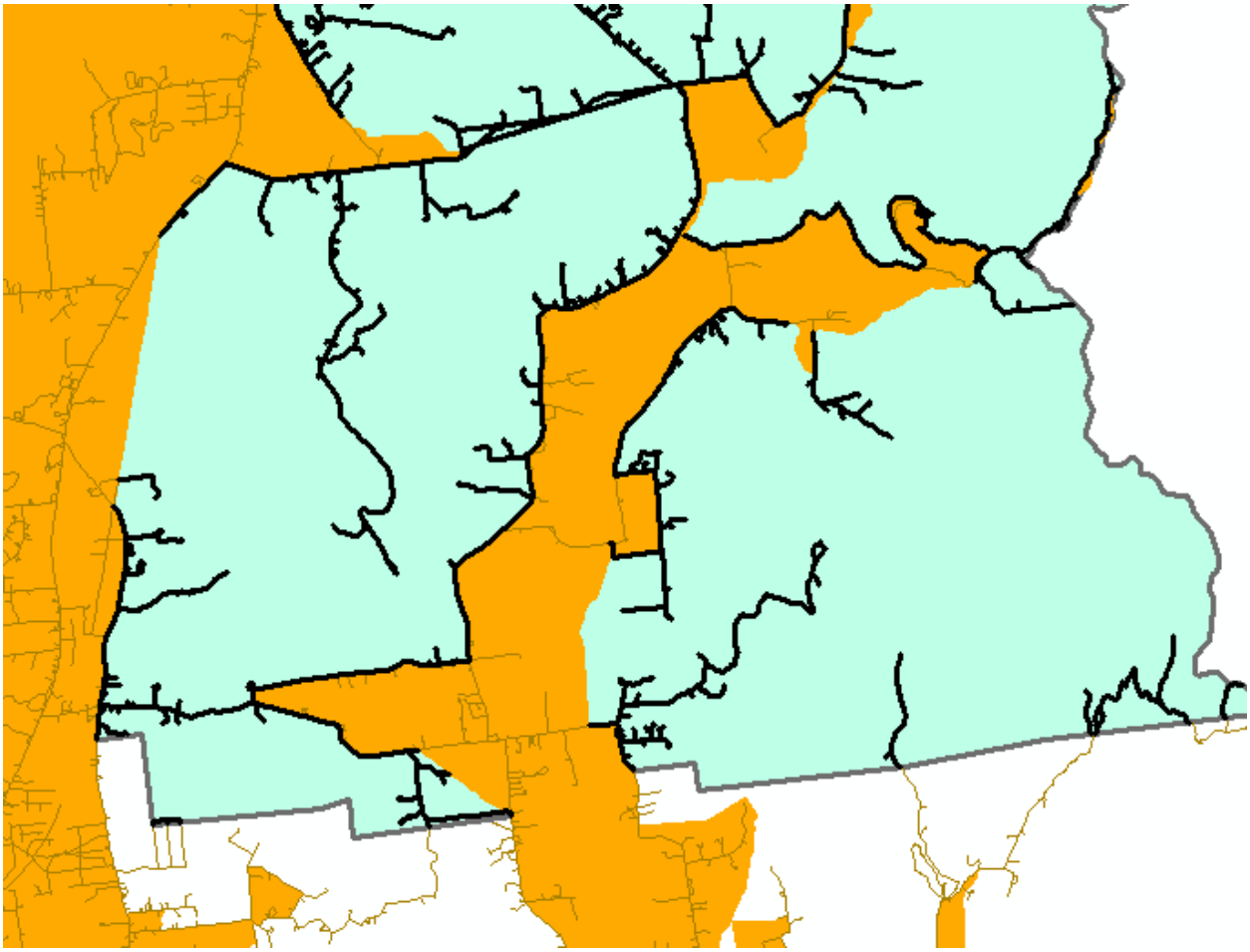


Figure 15-Output of the Segment Process

Wireless Coverage Process

In general, most providers of mobile Broadband submitted coverage information in a NOFA-compliant format. Other than attributions for spectrum and speed, little was done to this coverage.[17]

[16] An outcome not discussed here is how to handle address ranges on segments. As NTIA has asked for a Min and Max on the segment, deriving theses values for clipped segments is very problematic. Also the prevalence of alphabetic characters in addresses makes the min/max selections very arbitrary. We are grateful that addresses are nullable data elements.

Per Program Office direction, LinkAMERICA followed up with wireless providers where we determined that submitted data did not edgematch TIGER 2010 state boundaries. For the most part providers were unable to submit coverage data that edgedmatched as requested. In this case, we left the submitted data alone and did not perform any adjustments.

For providers who clip lower speeds out of higher speed coverage areas, we follow up and attempt to get revised coverage data.

LinkAMERICA continues to make aggressive efforts to bring additional WISP coverage into the NTIA dataset. For the most part, our outreach was with providers who were unable to supply sufficiently granular data in the past or those that could only submit wireless address points which is no longer a valid submission format. As stated earlier, we also work with third party service providers to getter coverage information.

Fixed wireless providers generally either supplied coverage information or infrastructure from which coverage estimates could be derived. Many allowed us to use their tower locations, antenna heights and direction/spread of coverage to derive a line of sight coverage estimate. In our experience, this is a conservative and reasonable derivation of coverage.

Some wireless providers submitted RF propagation studies. When this was done, there was a request that the signal strength be removed from coverage data. The request was honored. We note that some providers are very careful in that their coverage is an estimate of the probability of receiving an upstream link to their network. It is not intended as a depiction of any particular speed availability.

Other fixed providers were able to supply us with hand drawn maps or polygons/polylines drawn in Google Earth format. In these cases we did our best to georeference and verify the coverage areas with the WISP.

When we received coverage information in KML format, like the image below, we accepted the data as it was presented to us as the submitted coverage patterns were used in the provider advertising.

[17] Some polygon data did exceed the node count threshold. In these cases, data was rasterized to 100m cells and then converted back to polygons. The polygons were dissolved to multi-part geometry. This addressed the node count concern.

As the image above shows, in some cases we were provided hand-drawn coverage, as well as infrastructure. Instead of estimating their coverage using a line of sight or RF study, we elected to stick with the provider's supplied information. Our decision was guided by two primary factors:

If the provider is advertising using this coverage they must have specific confidence in its accuracy. If the provider can supply coverage, as well as infrastructure that reasonably supports the coverage, there is a very high likelihood in the accuracy of the information. Second the use of this coverage pattern provides an objective standard to verify against.

The downside, of course, is the polygon shown on the map may not represent our notion of how wireless coverage should appear.

In general we note several interesting trends in the wireless data. First, we can be successful in increasing the amount of WISP coverage when we aggressively pursue WISPs. This means we have to be willing to accept data on their terms and convey it into SBI formats. Some of our WISP submissions have taken over 12 hours to normalize into SBI formats. Second, we have to accept that some WISPs will not be able to supply FRNs. Third, there appears to be some variation on how the NOFA coverage definition is met. In other words, there seems to be a disparity on the necessary link budget necessary (e.g. -80 dB, -98 db, -120 dB, etc) to provide the appropriate quality of service for data services to be provided at a location/inside a location. Fourth it was very difficult getting providers to identify spectra used for

Broadband data services[18]. We are unsure if this is a competitive concern, or if the same coverage pattern is yielded for multiple frequencies. Typically, the spectra returned were those that a provider was licensed for. At this point, we have no reliable way to locally determine what set of frequencies are used to provide Broadband data services in a local area at a specific point in time.

Service Address Point Process

A handful of providers have requested that customer level, service address point data be submitted to NTIA. In these circumstances we have done minimal processing to preserve the provider's intent with this deliverable and not bias downstream NTIA use.

Our verification included checks against commercial or Public Utility/Public Service Commission exchange boundary maps. Points not contained within three miles of a boundary are not submitted to NTIA. The percentage of excluded data varies cross providers, but it tends to be under 1% of the total submission.

We retain from the provider the provided latitude and longitude, as well as Census block. For some coverage data, if a provider is unable to supply a longitude, latitude or Census block, we fill in these attributes. In those circumstances where we do not have a Census block, but we do have a longitude and latitude, we accept the given longitude and latitude and use that as the basis for our Census block assignment.

With point data we have tested for comparable geocoding success rates but do not overwrite provider information.[19] From this type of analysis we note the amount (usually little more than 10%) of addresses that seem to locate with less than street segment certainty. Deriving a thematic representation of the points on speed also illustrates some of the locational certainty issues in this point level data.

Coverage Estimation Process

Although the derivation of Broadband coverage into Census Blocks, street segments, or wireless coverage files is, in itself, a bit of an estimation process, there was an explicit estimation process required in cases where a Broadband provider either refused to participate in our survey, or provided such a threadbare submission that no carrier-based coverage information could be gleaned[20].

We typically resorted to three possible estimation paths.

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[18] One provider responded by email, "This mapping program is to provide the coverage area for Broadband provided by a company. Not to keep a detailed account of every aspect of a companies (sic) network."

[19] We will make a second geocoding pass on locations with no longitude or latitude from provider. We typically pick up ~5% from our second geocoding pass. Typically the issue tends to be address quality but also difficulties in geocoding in very rural areas.

[20] We report estimated submissions to NTIA as a non-responsive provider but we have data in the submission for them. This is the reason for datapackage.xls entries which are non responsive but contain submitted data.

For Cable (HFC) providers who did not provide any coverage information, we fell back to Media Prints data. Rather than using the entire Census Block Group gathered by Media Prints, we used only those Census Designated Places carrying the same or similar names to the Media Prints p_com field. Our reasoning was that Cable systems tend to be franchised on a municipal or at least administrative basis so the coverage will likely follow a governmental boundary. As a general rule, cable infrastructure is not available in the public domain[21] and what could be found was poor in quality and difficult to ascertain for validity.

For DSL providers who did not provide any coverage information, we estimated road-based coverage from their Central Offices[22]. We only used Central Offices that showed evidence of DSL or fiber-based services in the NECA 4 tariff. Road-based engineering areas were derived via ESRI Network Analyst to 18kft. These segments/boundaries were clipped to commercial wirecenter boundary edges.

For fixed wireless providers who provided no coverage information, we relied on their public websites to derive coverage maps. When these maps were available, we georeferenced them and tried to use the outer polygon boundary to represent their serving area. In other cases, when only a tower could be provided, we used a viewshed analysis and estimated line of sight coverage at 10mi per tower[23]. Because much wireless propagation is driven far below the Census Block and much engineering information isn't known (frequency in use, polarization of the signal, coverage pattern of antenna(s), local terrain/land cover) this was the most complicated group to estimate.

For providers who refused to provide spectrum information, we defaulted to unlicensed for Fixe d Wireless and NTIA category 1 for mobile wireless.

Speed

Speed attributes are reported both at the block (typical) and higher levels (maximum advertised and subscriber weighted). We note that in many cases, providers did not supply typical or subscriber-weighted speeds. In some cases, it appears--although we cannot verify--that their maximum advertised speeds were used to populate typical speed columns.

We do have limited testing data on reported speeds, but we have been careful to not use our typical reported values with carrier-provided information. If we do not have a speed value from a provider, we report an empty value.

Several service providers claim they do not have data on typical speeds available, but estimate a 20% overhead factor between the advertised speed and what may be experienced by an end user.

[21] The team tried to use data from the FCC Coals system and 321/325 fillings but this seemed to be a bit non-uniform in quality.

[22] Central Office location was derived from GeoResults. Wirecenter boundaries also came from this commercial product.

[23] In some cases we had an approximate radius of coverage but no height. In this case we used a 50' height estimate and then clipped the coverage to the provided coverage range. We also clipped wireless coverage to honor state boundaries but did not look for providers serving coverage with out of study state facilities.

As a general rule, in circumstances where a provider supplies a range of speed attributes, we assign NTIA categories based upon the midpoint of the range. We follow this rule unless we can determine other grantees are handling the same submitted information differently.

To support NTIA program office requests, we have also modified the structure of the Service Overview table. Even if Maximum Advertised Speed is supplied at the market or county level, we push that speed down to the contained Blocks. The only records that remain in this table, will be those wireline records with either a non NULL nominal weighted speed or ARPU value.

Middle Mile

Middle Mile information was collected directly from providers via survey or interview. Middle Mile is a "chicken or egg" type of challenge in that it is possible to verify that the infrastructure exists, but extremely difficult to know what the site is doing without engineering level assistance. Although most providers submitted "something," there was a significant variance in what that "something" represented.

The purpose of this section is to record some of the comments and questions we have received about Middle Mile. We hope this provides better context for our data submission.

Within the NOFA, Middle Mile was defined as (a) a service provider's network elements (or segments) or (b) between a service provider's network and another provider's network, including the Internet backbone. (Collectively, (a) and (b) are "middle-mile and backbone interconnection points.")[24]

Given the existence of the "or" in this definition, providers submitted a variety of information. Based upon the NOFA example, several fixed wireless providers interpreted Middle Mile in terms of the connection points from their towers to their own serving backhaul location. The topology was commonly Microwave from their distribution towers to their NOC. The NOC and towers were listed as the Middle Mile points. This seems to be consistent with the first definition clause (a).

Telephone, Mobile Wireless, and Cable providers tended to remain either silent on the question, or would provide a single location in which Internet peering occurred (clause b). A number of participants explained that the NOFA was quite ambiguous with data traffic moving back and forth over both TDM and IP networks--it was unclear where the distinction should be drawn. As a general rule it seemed like many providers listed a single location where Internet Peering occurred.

A number of providers refused to answer the question on grounds of confidentiality[25]. Others would not disclose as their Middle Mile points are not owned--another company provides the physical and

[24] From http://broadbandusa.gov/files/BroadbandMappingNOFA(FederalRegisterVersion).pdf at 54, visited March 28, 2010

[25] As received in email 9/30/10, "Due to security concerns and the risk of public disclosure of highly sensitive data, whether inadvertent or otherwise, ***REDACT***response to the Middle Mile and backbone interconnection request is limited to publicly available information available on {remainder not included}"

electronic connection to their network. In other words, the entity providing Broadband is not the entity providing Middle Mile.

Additionally, based upon the new Provider Type classification of "other," we have started to integrate points provided by Broadband service providers not meeting the NOFA definition. This includes POP locations and aggregation points for public / private networks.[26] Within a given submission there were two final attributes that tended to concern respondents. First, speed should be measured in terms of only data capacity and what exactly is "data" (e.g., can/should you segregate out voice or video), and is the relevant capacity of the physical connection, channelized to a specific virtual circuit on their network.

Finally, a number of other providers were unsure of the height above grade measure (is this their floor, the street outside, etc). We seem to have a combination of height above or below grade, as well as heights above mean sea level (AMSL).

To the extent possible in our timeframe, we verified the location of a sample of Middle Mile points. Where we could see infrastructure that appeared to be consistent in location with other provider infrastructure, we felt that the location was accurate. In some cases, the point provided seems sensible (is on a road, near other equipment), but using imagery, we couldn't find a place where this type of connection could occur. This wouldn't be unforeseen, in that Middle Mile connectivity likely takes place in a protected environment much smaller than a standard Central Office installation.

Mobile Wireless Coverage

We have received mobile wireless coverage from most mobile Broadband providers in each state. At this point we have cleaned the geometry of the data and attributed it with spectra, NTIA speed categories and FRN as required.

Where possible, provider derived coverage has been reviewed for consistency against the commercial licensed product. To a limited extent we also use licensing locations and tower infrastructure to spot-check supplied coverage. This mode of verification remains complex, given the lack of facility-based information with mobile wireless.

Finally with respect to mobile Broadband services, we note several trends.

First LinkAMERICA used the NTIA supplied frequency tables to report speeds consistent with other grantees. In circumstances where a provider supplied a range of experienced speeds, we used the portion of the range consistent with the most frequently reported Grantee value.

Second where a provider reports multiple frequency bands in use but doesn't distinguish these bands by submitted SHP file, we submit identical geometries but attribute one geometry to each submitted spectrum value.

[26] As discussed in our readme.txt file, a number of middle mile points were lost in validation due to their location in adjacent state. This will cause a decrease in some providers relative to prior submission.

Third we are seeing a trend toward increasing Broadband speed. As of this writing, there is not consistency across providers in how they attribute the advertised 4G speed values. In other words, for some providers 4G means advertised speed categories increase. For other providers the speed value did not change.

Fourth, we have requested providers submit SHP files that are consistent with the TIGER 2010 boundaries. For the most part, providers have not done this. We have not modified the submitted data to impose the TIGER 2010 state boundary.

Verification

Data verification is an ongoing and evolving process. Clearly, with each new data submission there will be a validation process at hand and at the same time, our team continues to expand and improve the efficiency and effectiveness of our data verification routines. Consistent with the movement toward an fGDB export database and use of a data receipt script, much of our validation effort is spent in supporting the ETL processes into the required formats. In future data submissions we will continue our work to stabilize and improve the business process that normalizes provider submissions into NOFA formats.

Verification Methods Summary

Our overall verification standard is focused on the level at which we supply processed data to NTIA. This means that the vast majority of our verification process and resources will be focused on verifying provider identity, coverage, advertised speed and appropriate metadata for Census block's less than or equal to 2 square miles.

We believe three broad verification themes are important to consider

a) The first step of broadband service verification is a consistently applied market definition—we call this provider identity verification.

b) There is probably not a single dispositive method of verification. Rather, a number of verification approaches are needed to appropriately classify confidence in data submitted to NTIA.

c) Verification approaches tend to meld together. As an example a web survey is complimented by a phone survey but expert review and external data may be necessary to reach a final informed judgment.

The table below demonstrates the various methods used across each feature class submitted to NTIA.

	Data Types			
Verification Method	**Census Block, Road segment or, address specific service**	**Mobile wireless service availability**	**Middle mile infrastructure locations**	**Community anchor institutions**

	availability			
Provide/Subscriber Identity Verification	METHOD USED	METHOD USED	METHOD USED	METHOD USED
Internal data consistency check	METHOD USED	METHOD USED	METHOD USED	METHOD USED
External data consistency checks	METHOD USED	METHOD USED		
Carrier confirmation	METHOD USED	METHOD USED	METHOD USED	
Public review	METHOD USED	METHOD USED		METHOD USED
Anchor institution review				METHOD USED
Expert review	METHOD USED	METHOD USED	METHOD USED	METHOD USED
Telephone sampling				METHOD USED
Purchased Datasets	METHOD USED	METHOD USED	METHOD USED	METHOD USED
Developed Datasets	METHOD USED			
Web-based surveys	METHOD USED	METHOD USED		METHOD USED
Field Surveys	METHOD USED	METHOD USED		METHOD USED

The following table defines each of these methods and provides a summary of why this method is used, and the value we gain from it.

	Definition	**Methodology**	**Purpose**	**Benefit**
Provider Verification	Provider verification is the process of assembling a	Provider verification involves combining multiple data sources,	Without a consistent understanding of the provider	The main benefit of this verification process is understanding who is providing broadband

	broadband provider database, determining which providers are properly classified into SBI eligible providers and developing contact information.	interviewing providers and classifying the broadband provider type.	'market' it is impossible to appropriately classify the coverage data. It is also impossible to explain to consumers of the data why a given provider is or isn't available in the submitted data.	services, are the broadband services NTIA compliant and how do you 'contact' this provider (Name, DBA, FRN, Holding Company)
Internal data consistency check	An internal data consistency check is a validation measure across at least two dimensions. First is the provider data consistent with prior submissions. This would be an examination of this submission relative to a prior submission. Second is this submission consistent with the technical specifications of the service offered.	Most of this validation is performed using our spatial databases and running queries that compare submissions. We also use a similar set of queries to isolate transmission of technology outliers. These would be data sets which offer speed technology combinations which are unusual relative to other data received across all states.	The purpose of this type of validation is to understand how things change over time and why. It also helps inform us for circumstances where we have data points which appear to be outside of the norm. If these outliers are detected, they can be pursued directly with the provider.	The main value is understanding why something changes and providing an opportunity to engage with the provider to understand why there has been a change.
External data consistency	An external data consistency check is a measure of	External validation can be performed by verifying	We don't believe a single,	External validation provides an external measure of data quality

checks	the provider data against external sources (not from the Provider). The distinction between internal and external isn't pure, but our typical experience has been that External checks involve the acquisition of additional data sets and a comparison across multiple sets.	supplied coverage against third party data sources. An example would be to test provider claimed DSL Census blocks against a commercial source of exchange boundaries. Wireless coverage is also compared to radio locations.	exhaustive third party data set is available for validation. We do believe a combination of external datasets can be used to inform and help filter out the false positive cases from provider data. We also note that the external data appears to diminish in accuracy as the area of analysis becomes less urban.	assessment not influenced by internal data sources. It can be one of the more effective means of isolating false positives in submitted data.
Carrier confirmation	Carrier confirmation is the process of sending processed data back to the service provider to ensure that translation into NTIA formats is fair and appropriately accurate.	We use two techniques to accomplish this. First a provider's data is summarized in a tabular format. This lets the provider quickly verify firm information (FRNs, DBAs, counties served). We also develop two sets of check maps. One is a PDF version and the second is a	One of the more critical steps in broadband mapping is translating carrier supplied data into NTIA formats. Providing verification deliverables to the service provider (carrier) is an	Carrier confirmation gives the provider information on how their data will look when submitted to NTIA. It also helps short circuit complex problems like online map display problems—which tend to come from FRN issues or incorrect data entry. This process also helps to strengthen the sense of ownership and participation with

		Google Earth (KMZ) version. Both versions display the NTIA reported coverage and speed. A different map is developed for each technology of transmission	important external feedback process. Several providers also ask us to repeat this process before data are submitted to NTIA so they can see what will be submitted to NTIA.	providers.
Public review	Public review is the process of collecting structured feedback from the general public in a manner which can be analyzed and used to improve/validate the submitted data.	Currently we use an online map 'layer' which provides consumers the ability to feedback about the coverage and provide in depth information about their concerns. The maps are also discussed within the context of planning teams within each state. We receive feedback from these meetings.	As with other crowd-source approaches the intent is to allow the general public to feedback and improve the displayed and submitted data.	The benefit is to provide feedback and also display the comments of the general public. As a mechanism for validation the key is to develop feedback data which is structured in way that informs the mapping process.
Anchor institution review	Anchor institution review is targeted surveys intended to better understand the Anchor Institution	We have used three methods to verify anchor institution data. The first is a targeted series of	As Anchor Institutions represent a different class of coverage information as	Because CAIs represent a very distinct stakeholder community, building identifiable connections between the SBI program and the anchor

	broadband market.	telephone calls. The second is specifically targeted mailers. The third is direct interviews with stakeholders. Schools for example, may have someone at the state level who maintains information about broadband connectivity.	well as a very different type of end user, a focused stakeholder management, data acquisition and data review process is advantageous.	institution community is important. Tailoring a specific data acquisition/ data review process helps Anchor Institutions establish a reliable set of infrastructure benchmarks which they can use to fulfill their mission.
Expert review	Expert review is the process of using subject matter experts to review submitted or processed provider data.	The method of subject matter review will be dependent upon the type of data in question. In the past this has taken the form of conversing with a wireless engineer to ensure that the coverage pattern appears plausible for a given technology. It may also involve a cross check on data from a second source—can this type of middle mile infrastructure support the maximum advertised speeds in this area? SME validation is also helpful trying to	The purpose of expert review is to get a second opinion regarding some aspect of submitted or processed data. Given the large number of submission formats and innovative ways to supply broadband, it is always helpful to have multiple sets of eyes available to reduce errors from misunderstanding.	The most significant benefit is to have a secondary source for back checks and verification. For the most part expert review is from an engineering or deployment resource. Expert review also helps support process transparency so there isn't a closed GIS driven process making all the decisions.

		understand ambiguous information in submissions.		
Telephone sampling	Telephone sampling is the process of using targeted phone calls to verify aspects of submitted or processed data.	Telephone methodology tends to be consistent across the type of data being verified. A subject location or individual is identified. The phone number for that location is identified and a call is placed. The person performing the survey asks a scripted set of questions and records the responses in a database. For example, our team produces a survey to develop and monitor access and use trends at a regional level.	The purpose of a telephone survey is to gather in depth information from a targeted respondent. We would likely use telephone survey for targeted purposes--either clarifying anchor institution data or randomly polling consumers to better understand attitudes.	The primary benefits are to develop in depth information as well as surveying a large number of respondents regarding opinions or behavior. Phone surveys tend to be more helpful to survey attitudes or to find out location specific information. Telephone sampling is used in our CAI and consumer surveys.
Purchased Datasets	See external data consistency checks.			Also note that not all external data checks must be purchased. For example Census data could be used for an external consistency check but it is freely available for download.
Web-based	Web based	In the case where a	The purpose in	The benefits of web

surveys	surveys can involve three dimensions. First a web survey (a form available to be filled out on the Internet) can be used to supplement and better understand consumers. A web survey could be a compliment or a substitute for a telephone survey to target a specific demographic (a web survey can also be part of a social media campaign). Further web surveys can be used to verify provider information.	web survey is a compliment to phone or in person, a survey instrument is developed and then respondents are invited to complete the form. In the case where a survey is a mechanism to gather additional information from provider web sites, this could take the form of manual queries (looking for address listed in a Census block) or automated scraping where information is pulled from a website via a specific web application. We currently use both approaches depending on our goal.	all cases is to gather additional information via the Web.	survey are its relatively low cost as well as the ability to gather specific information into a form that can be easily used by downstream work processes.
Field Surveys	A field survey is sending a team of skilled participants into the field to verify submitted data or sample some aspect of the environment in a given area.	Field survey methods involve assigning a field team, equipping them with data acquisition hardware, ensuring they have a consistent skill basis and recording	Although expensive, field surveys are sometimes the best way to verify information such as provider equipment	The benefits to field work are significant. They can help us better understand the exact phenomenon in a particular area.

	observations. To date most of our field survey work has been in engaging CAIs into the process. In Q2 of year 4 we are preparing to launch an app for download to mobile devices with the intent of testing mobile wireless speed and access.	presence or the strength of a wireless broadband signal.

Verification Standard

Verification is a broad term, but in our definition it boils down to determining if broadband coverage is in the right place. For a given provider, the question is whether the coverage is assigned to appropriate Census Blocks, road segments or area features. Coverage verification can be further broken out into two distinct classes:

Technology verification, which is determining if the provider is listed with a technology consistent with their marketing information.
Speed verification, which is determining if the speed supplied for that block, road segment, point area file or market area is consistent with the technology and the marketing information received.

The final verification dimension is consumer feedback and crowd-source verification. This is a dynamic set of steps we are beginning to implement. One side of this is responding to consumer concerns. The second is using the crowd sourced data to validate provider claims and, if appropriate, update the map and the underlying data.

At this stage, our working hypothesis (confirmed by our experience) is that there will not be a single measure to indicate broadband coverage availability in a Census block or along a segment. From prior work, and examining our current provider submissions, we believe that there is too much variation below the submitted record to make a single binary yes/no indication. Rather, there will be a series of measures that combine to provide qualitative confidence (a classification scheme) in our indication of Broadband availability at the block, segment, or wireless polygon level. We believe such a qualitative classification scheme is both relevant to and supportive of NTIA interests, as well as the interests of our end-user community – that is, the states and citizens we serve through this program.

The intent of this section is to illustrate why our team is moving toward a particular verification methodology. Our team is learning as we go along, and will adjust and improve this thinking. But given our experience to date, this is our path. As stated above:

First, coverage verification is at the level of data submitted to NTIA.
Second, coverage verification is enhanced when there is a secondary measure of availability (such as infrastructure presence or serving area boundaries)
Third, given the limited resources of this effort, the most important coverage verification process to implement is the erroneous dispersion of coverage. These are the "islands" of coverage isolated by significant distance from other covered areas. In other words, Broadband Internet likely doesn't exist far away from other areas with Broadband Internet access supplied by the same provider.
Next we present several examples which illustrate the complexity of coverage verification.

The first example is taken from a gentleman who requested a map change in Alabama. His home is near the yellow dot. The darker grey Blocks are covered Census Blocks. The black lines are covered road segments. He cannot receive DSL from his incumbent provider, although his neighbors can. The incumbent carrier does have at least one structure in that block from which Broadband services can be provided; unfortunately his home is not served.

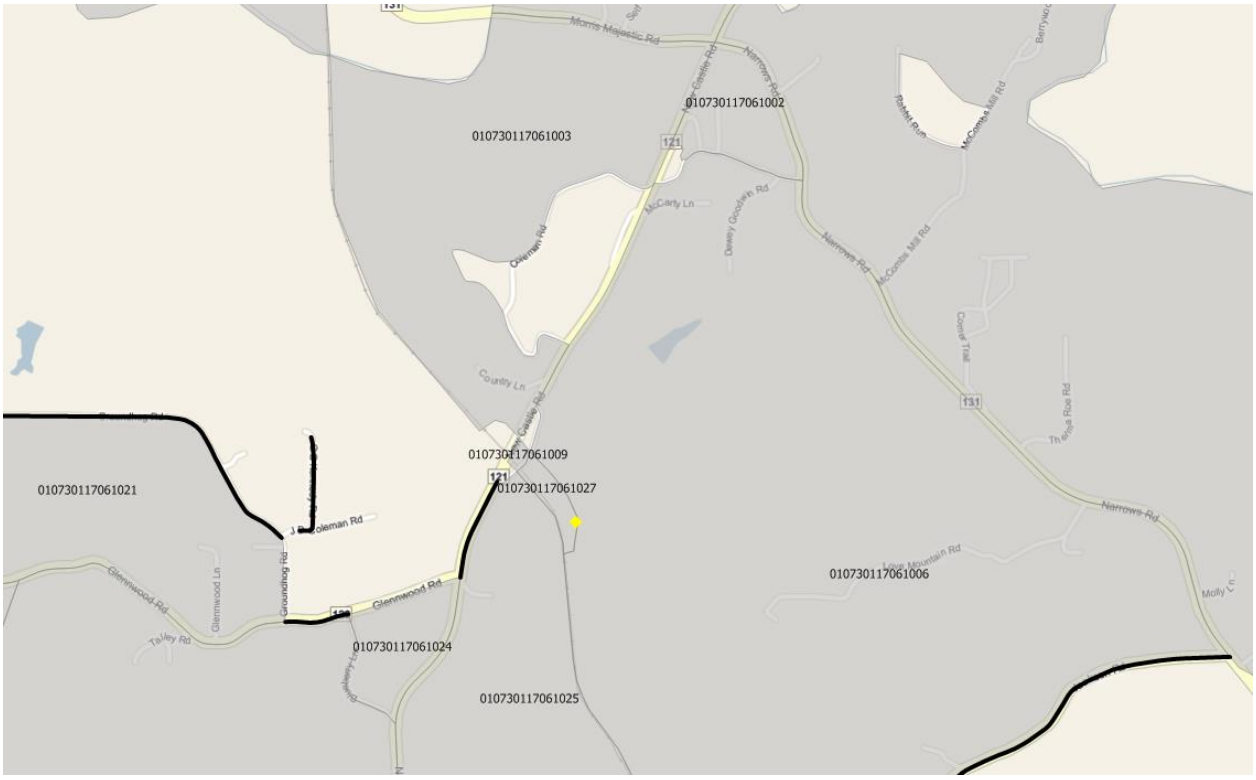


Figure 16--Sub block variation

Because the SBI program requires the depiction of coverage at the block level, the above map has been correctly generated. However, from the customer's point of view, the map is inaccurate. This requires

us to explain that the maps are not intended to be a structure-level qualification, at which point some consumers question the value of the maps when seeking service information.

Beyond this type of one-off structure-level qualification, sometimes, as shown below, we have even larger gaps in provided coverage. The image here shows an "outlier" block that could be an error, or it could indicate missing Blocks along a major road that should have been filled in. In this figure, the outlier block is highlighted in turquoise.

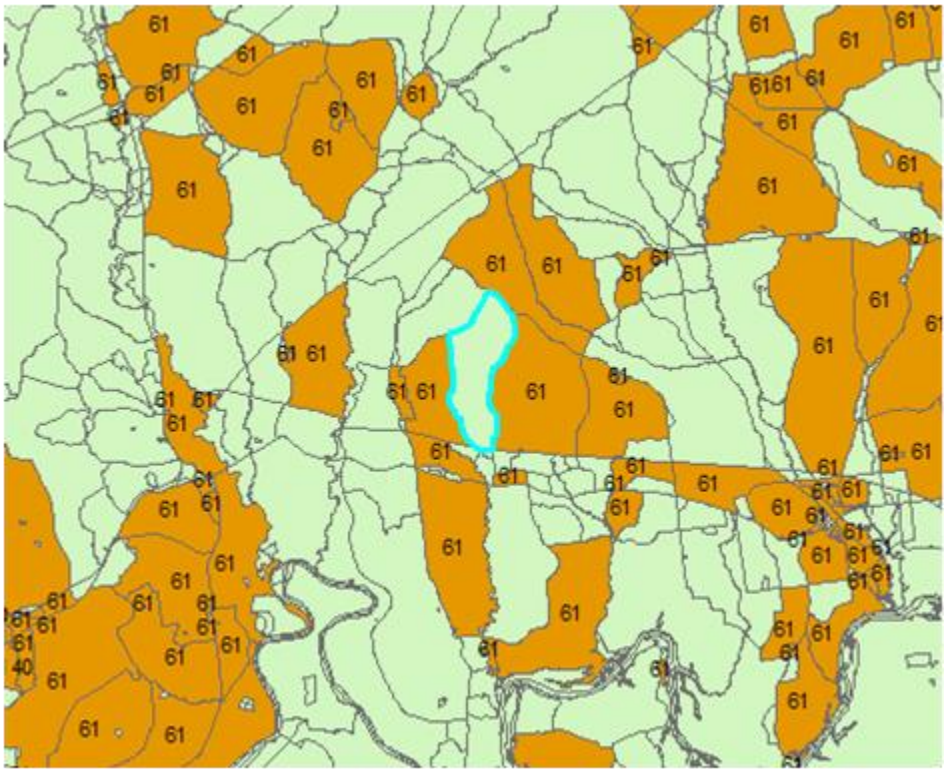


Figure 17--Dispersion in Submitted Data

In this particular case, we are faced with a different verification question. Based upon the properties of the neighbors, we believe this block should likely be covered (coverage interpolation,) but supplied data from the incumbent says otherwise. Although we don't have information to know how much of the data submitted to us is generated, our sense is that geocoded customers or plant are used. In this case the block dispersion could be the result of a side of the street assignment rather than an availability assignment. In other words the data may speak to where is working plant rather than where could service be provided in 7 to 10 days.

The next example shows where an interpolation process could require some adjustment. The figure below shows a town level view. There are some smaller Blocks that are likely covered by interpolation logic, but we also do not want to extend coverage beyond a franchise boundary as in the areas shown in a box on the bottom of the map.

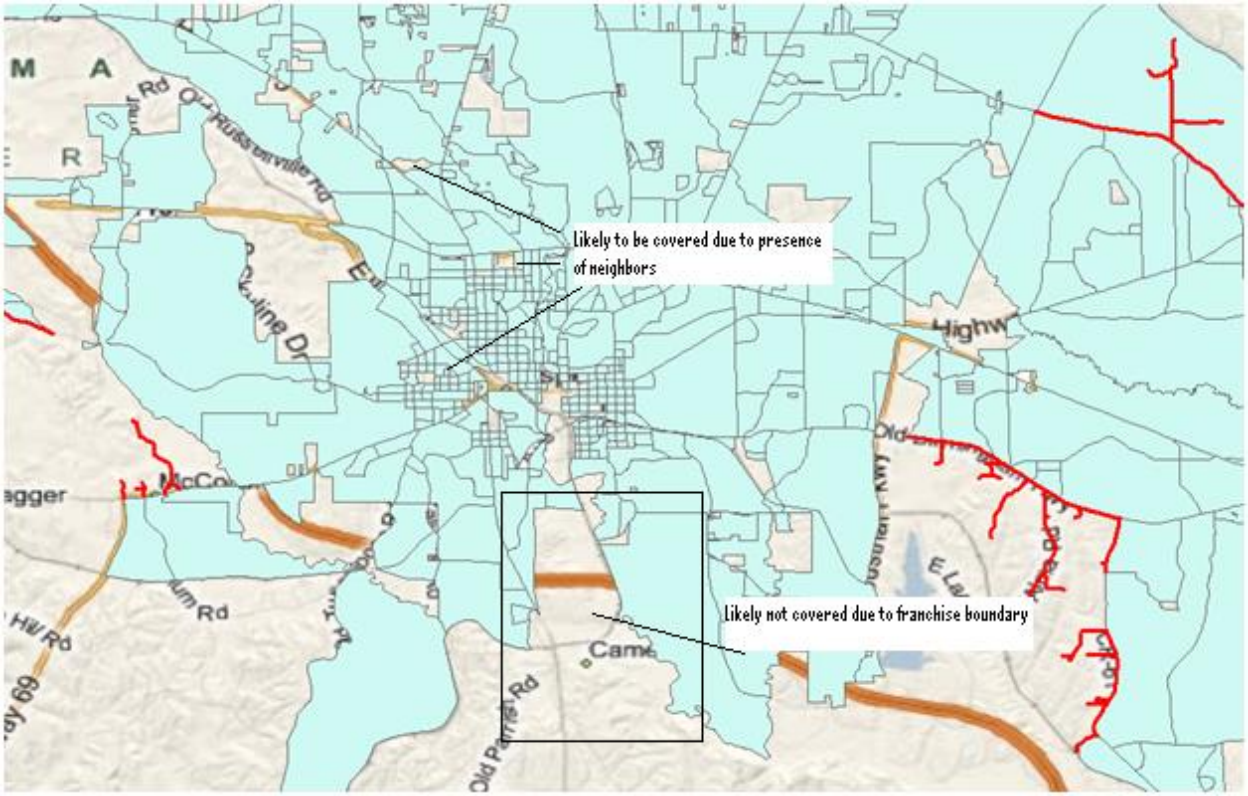


Figure 18-Where do you stop interpolating?

From what we can gather from some providers, the submitted data—data with consistently high degrees of dispersion or coverage holes—tends to come from geocoded billing records. In this paradigm, this means where there are no billing address points; service is not identified on a map. The interpolation verification question then takes on three dimensions.

First, if a provider has no customers in an area, how can we know if they would be able to provide service in a 7-10 day interval?

Second, if we use the properties of neighboring Blocks to interpolate coverage, when should we stop (e.g., at a franchise boundary, at a certain distance, etc.)?

Third, if we are comparing to a data source that examines coverage at a higher level (such as 477 Tract) do we use the Tract information to assign information block level coverage or do we use the tract coverage to filter out dispersions in coverage?

We continue to work with providers to get additional information to help us better understand and contend with this type of circumstance. However, we have not been entirely successful at getting franchise/service area boundaries that would address much of the issue.

The final map shows this dispersion problem, but to an even larger degree. This solitary large block is likely the result of a bad geocode, but we don't know, given the data that has been submitted by the provider and the "single customer in a block standard" set by the NOFA clarification.

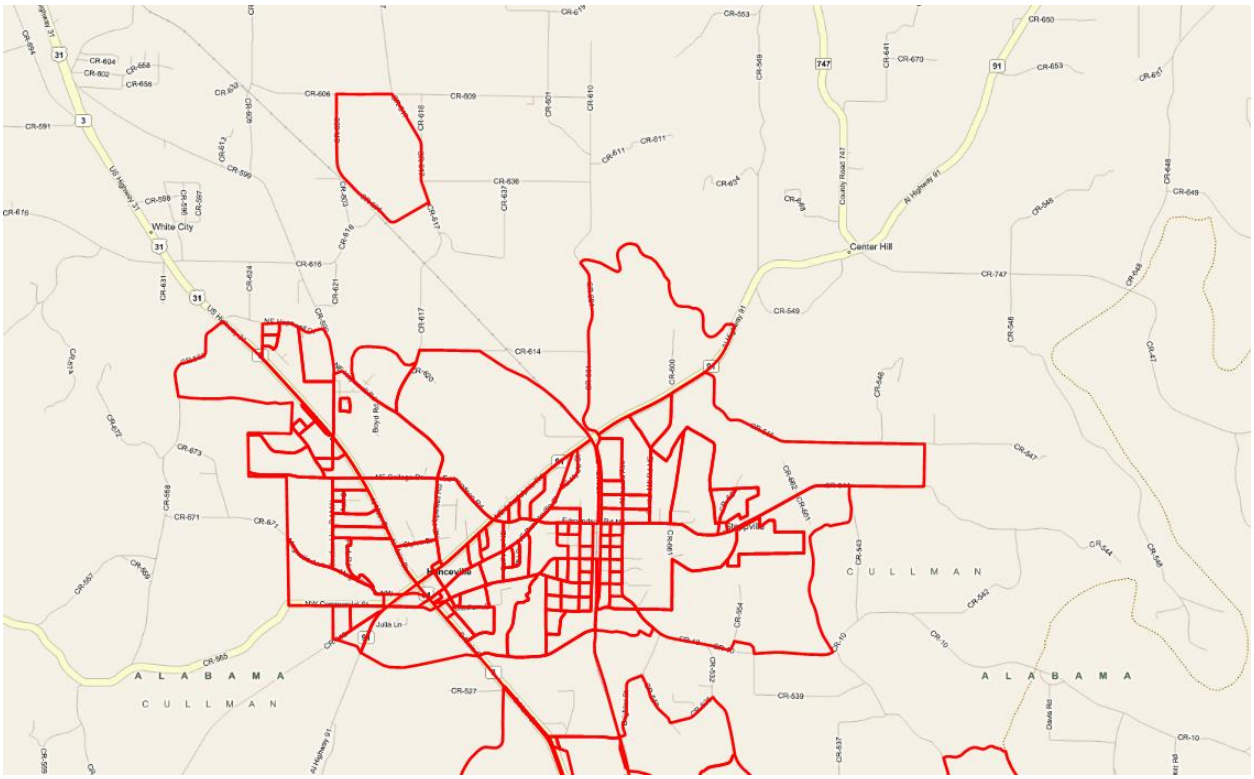


Figure 19-Dispersion in covered Blocks

Due to the fact that this situation is quite obvious in display, this type of problem is one that we are more aggressively trying to resolve. Where a single block has no neighbor offering comparable coverage and is a specified distance beyond an exchange boundary, our approach has been to filter these Blocks out. As of now, this filter is limited to incumbent xDSL providers because we have a good source of exchange boundaries.

The exchange boundary dispersion verification method breaks down when examining providers who are more likely to CLEC into neighboring territory. In the figure below, the black line represents the exchange boundary, while the continuity in the DSLAMs likely points to coverage extending along a road into another provider's territory.

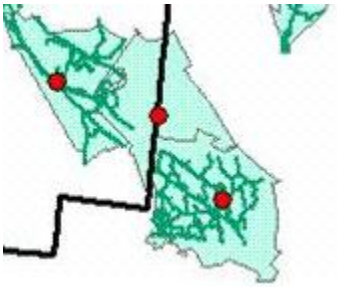


Figure 20--DSL Coverage outside of exchange boundary

In sum, the variability in our source data continues to suggest that our dynamic verification process is relevant, appropriate and evolving in a manner consistent with the overall program. And, as noted above, we believe the more meaningful outcome of our verification processes will likely be a series of qualitative indicators or expressed confidence levels. Our concern, as with the development of any sort of classification process, is how rigid we should make this classification given the variation in our input data and the varied perceptions of service providers, map viewers and down-stream data consumers.

Verification Work Process

To support our dynamic multi-factor verification process, we have implemented the following steps.

Between submissions our provider relations team works to analyze our current broadband provider ecosystem and capture any changes such as acquisitions, mergers or cessation of operations. They also remain in touch with providers who have indicated when follow-up is necessary. The team confirms that the providers who submit data are NOFA compliant. Given these steps they begin a survey and awareness campaign to get data submitted for the program.

When data is received, an analyst reviews the submission and any immediate questions or concerns are sent back to the provider as quickly as possible. We have found this gatekeeping step very helpful in making sure we understand the intent of the submission.

For all providers who submitted data to us in the prior round, the provider received both a tabular data summary and mapped output[27]. Prior to releasing the "check maps" to providers, we inspected each provider's coverage area. After this in-house review, we solicited a second level of feedback from providers and received a number of requested changes and corrections used in the development of the current dataset.

For those providers who submit only block or segment level coverage (i.e., in those cases where we have no infrastructure to test with) we test for coverage containment within known service boundaries. The intent of this validation step is to remove Blocks that are obviously erroneous.

We have also begun to perform a mechanical test against wireline providers. This is an examination to ensure that each feature submitted has some neighbor within 1 mile. We are testing this process to try to understand what the neighbor distance should be. This has proven to be a difficult process.

We also verify the submitted speeds against the typical speed ranges in the NTIA frequency tables. If we note a value outside of typical range, we ask the provider for clarification. These responses are recorded.

As mentioned in the sections above, we have implemented a check on dispersed Blocks, but we have implemented less with respect to coverage interpolation (holes in coverage). We continue to work on a

[27] For the verification of round 3 data, we submitted both PDF and KMZ (Google Earth) format check maps. Some providers prefer to work with the Google format as it supports easier modification. Others continue to submit marked up PDFs.

series of mechanical tools to assist with the inspection process but have run into challenges related to geographic basemap and timing.

As our submissions have moved online, we have also begun to benefit from crowd source feedback. In some cases this has helped us identify and fix errors in our underlying data. In other cases, as we have shared with NTIA, we have encountered some perceptual issues rooted in how the data are developed and modeled to comply with the NOFA. Depiction of uniform coverage in Census Blocks continues to be a challenge. Despite our best efforts to explain the full block coverage requirement, we continue to receive complaints that the coverage shown on the map is not accurate for a particular location within that block.

Cross Submission Validation

As part of our validation process, we compare submitted data from the current submission to the submission prior. This is an automated review in that all providers are examined in terms of submitted record counts and count/technology/speed combinations.

Sprint	**1**	**2**
80	**1**	**2**
3	1	1
6		1
StarBand Communications, Inc.	**1**	**1**
60	**1**	**1**
4	1	1
Starlite Computers	**1**	**1**
70	**1**	**1**
5	1	1
TDS	**27884**	**27716**
10	**27878**	**27716**
3	6219	4538
4	1761	2036
5	8778	8767
6	833	899
7	9023	10368
8	1264	1108
50	**6**	
8	6	
TEC - Cherokee Division	**1828**	**2012**
10	**1239**	**1352**
5	426	479
6	212	314

Our team reviews the changes to make sure the scale of the change is consistent with our expectations given modified survey data.

We then take a second pass at the same submission summary data to review any providers who will be flagged by the submission script. Again this comparison is made between the current and prior submission.

A	B	C	D	E	F
DBAName	TRANSTEC	MAXADDC	Round	RcdCnt	Lyr
AT&T Mobility LLC	80	7	7	1	WR
AT&T Wisconsin	10	7	6	33911	CB
AT&T Wisconsin	10	7	6	45	SG
AT&T Wisconsin	10	7	7	38	SG
AT&T Wisconsin	10	7	7	34213	CB

This second pass helps us to prepare documentation for our readme.txt file. It also helps us monitor where there have been large speed changes by provider. Where we do see changes , we contact the provider to understand how the networks in place support the speed reported. We also cross check advertising materials to make sure the reported speed is being actively marketed.

Consumer and Provider Responses to Deliverables

Here, we segue from internal verification to external verification. We view responses to our work product as a form of validation and verification. On the one hand, this gives us the opportunity to fix mistakes and then generate QA steps to make sure that the problem does not reoccur. We also learn how to improve what we are doing or better explain what we are doing to a community not always familiar with the NOFA and program office framework. On the other hand, listening and learning from this feedback helps us better target our mapping deliverable to meet the needs of our external customers. In this second case, external feedback not only provides feedback on perceived qualities (or lack of quality) in the data, it helps us to learn if we are developing data that is truly helpful to downstream users across a wide range of usage and intent.

At this point, our external deliverables take three forms: State Broadband Maps, data transfer to NTIA used for the National Broadband Map, and text format data requested by outside parties.

Online Map Experiences

With our State maps online, we continue to harvest viewer feedback and comments. Because an online map allows someone to zoom in far below the scale of the data, comments reflect sub-Census block concerns. While important to the citizens reporting these issues and to our Broadband planning teams, this level of data is outside the scope of our core validation process, which as noted above, is focused on the level of data submitted to NTIA.

There are several other themes that our team believes are important to share. These comments are actually quite helpful because they also improve our data processes to better meet the needs of map viewers. For example, we have invested significant time in harvesting more segments from provider data. Because the appearance of segments is so important, we are putting time into ensuring a visually appropriate edge match between the roads we harvest and the Blocks/roads we will show online. On a

technical level, we also believe that a good segment process will help us understand more about dispersion in the data, and what is valid versus what is not valid.

Our team reviews the online comments on a periodic basis.

Online Display of Consumer Feedback

We have completed development of a consumer feedback layer for our online maps.

The intent of the new layer is to show viewers the feedback of other map viewers. This layer went live after the Round 4 data was posted.

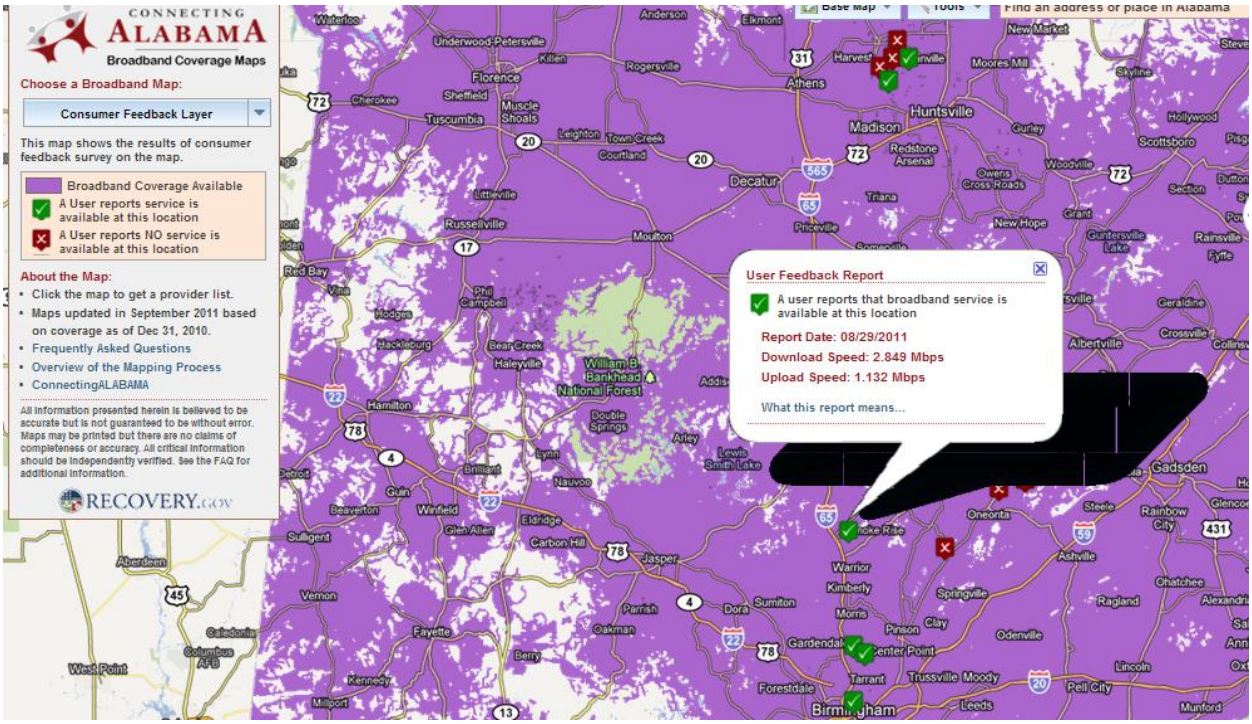
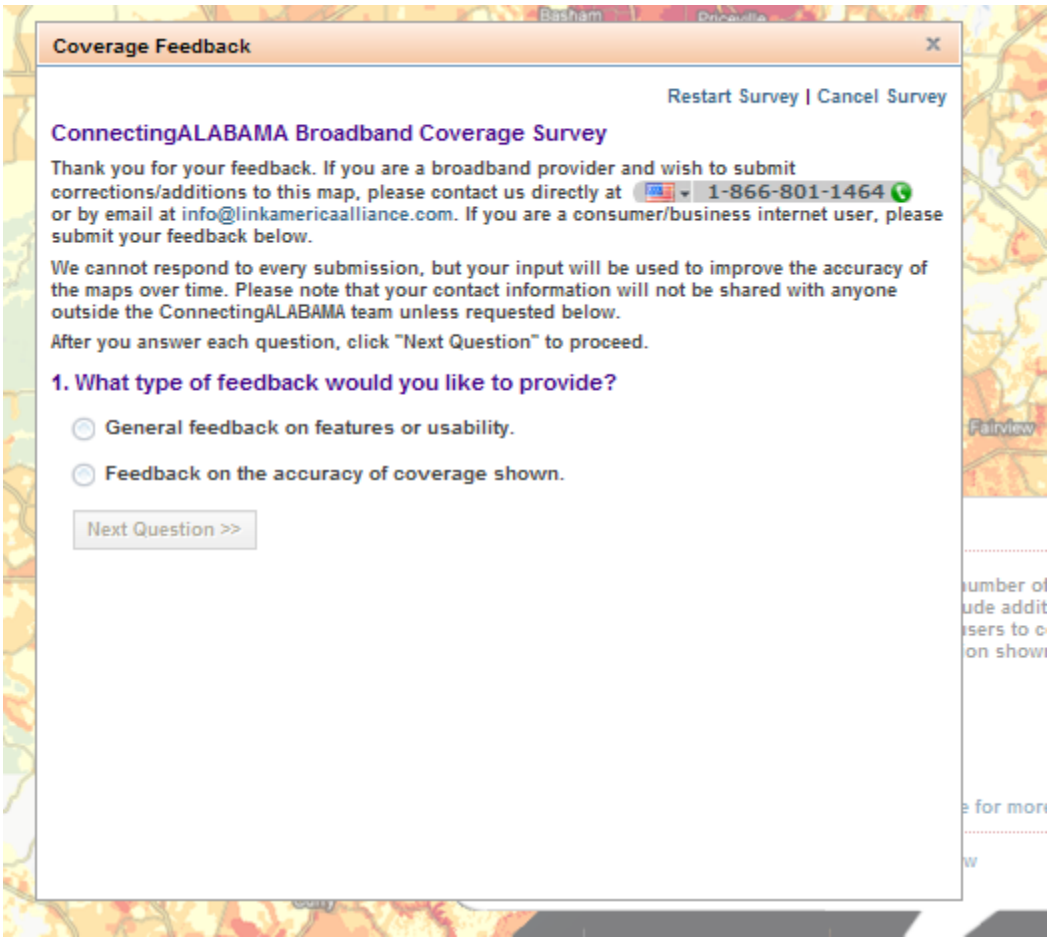


Figure 21--Consumer Feedback Layer

To gather feedback, we use a survey wizard which asks the end users to categorize their concerns. The survey went through several iterations of design and usability testing. Our experience has been unless we get a way to constrain the user feedback into manageable categories, it becomes very difficult to act upon.



As mentioned by other Grantees we struggle with how to use all of the feedback we receive. The qualified data points seem to fall below a volume in which we can infer significant modifications to the map data. Nevertheless, we believe it is important to gather structure and display the feedback to support project transparency.

Perception of Unfair Treatment Across Technologies

Several Broadband service providers have expressed strong concerns regarding how wireline services are displayed, as contrasted to how wireless coverage is displayed. This is an artifact of the SBI data model. As an example, consider the figure below.

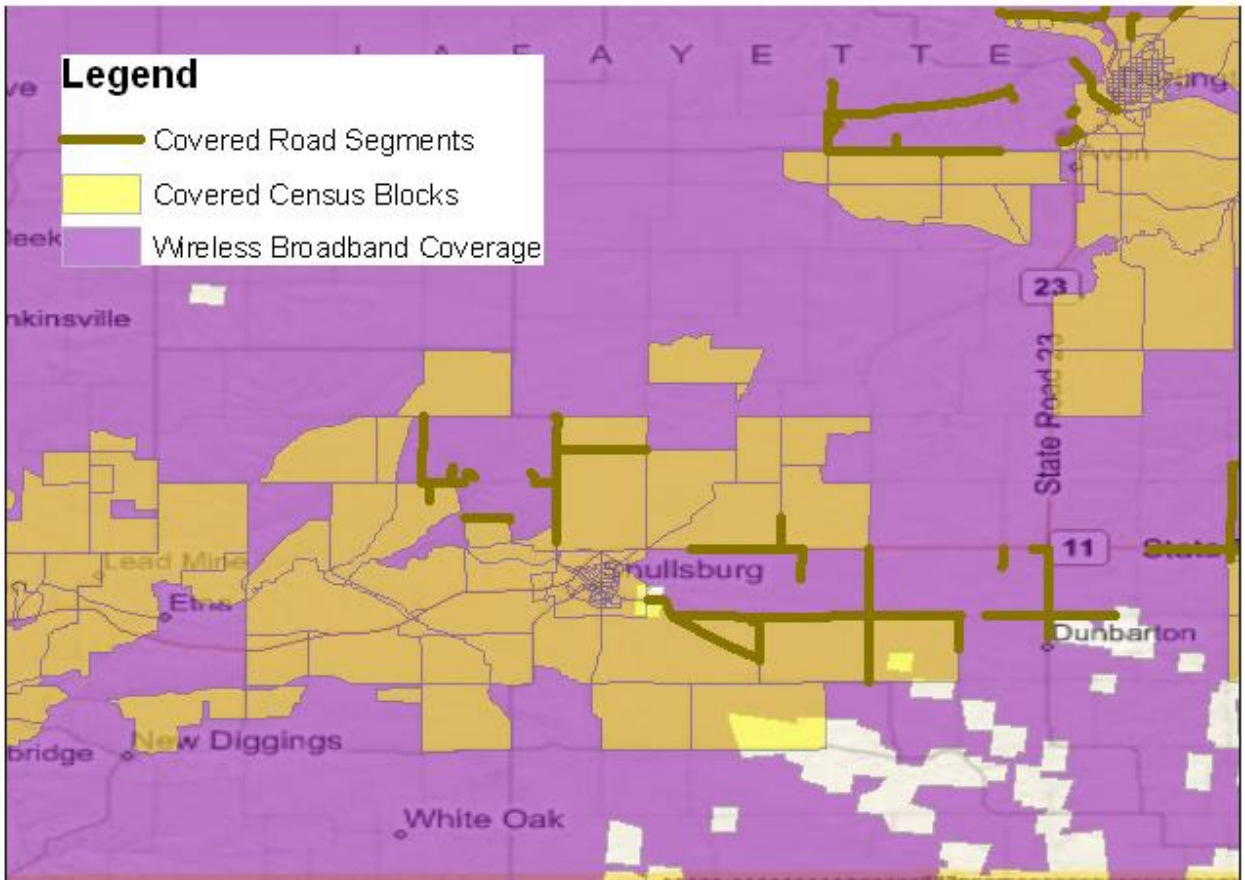


Figure 22--Multi Network Coverage portrayal

In this image, covered Census Blocks are light gold. Covered road segments are a darker gold and wireless coverage is purple. The concern seems to come down to how a wireline provider's coverage is shown in the large Census Blocks (greater than 2.0 sq mi). Some wireline providers have expressed dissatisfaction because their coverage is only tied to road geography, which leads to a visual "hole" in their coverage map. At the same time, they feel that it is unfair that the wireless provider's coverage is shown to be uniform in the same area. Put another way, if our maps show wireline in terms of Blocks and segments, why don't our maps show wireless the same way? This concern is getting amplified because wireless speed does not vary by block whereas wireline does.

Loss of Geographic Granularity

Some providers particularly those who submitted facility level information are disappointed when we have to roll the derived data up to Census blocks or road segments as this changes the appearance of their service areas. This is especially important in rural areas where the larger blocks represent more of the service territory. Further, the FCC Order requesting service level boundaries has made some providers unhappy when submitted block level information does not line up with their service areas.

Perceptions of Carrier of Last Resort (COLR) Obligations

Some wireline providers have also expressed dissatisfaction because online maps limit the distance of coverage from a road segment. In our current online maps we buffer a wireline carrier's service 300' from road centerline. A number of providers have expressed that they are mandated to provide voice coverage (which Broadband will accompany) anywhere in the Exchange. There seems to be many dimensions to this argument, but the basic concern comes down to not being able to accurately reflect the scope of their COLR obligation within the mixed block/segment view. Their ability (or lack thereof) to actually provision such services for new users within a 7-10 day period adds yet another level of complexity when attempting to fairly portray their coverage capabilities.

Intentions of Coverage Mapping

When a viewer of an online map clicks on the map (or zooms to an address), they are provided with a pop-up of service provider coverage in the area. The critical question is this: what is the area to which that pop-up window responds to? In the past, we reported back to the specific Census block, or buffered road segment intersected by the user click. As far as the map was concerned, once we move off of that road, or out of that segment, we have a new area to examine.

Our sense, given feedback received, is that our provider view should be a bit more tilted toward finding providers in a general area, rather than finding providers at a single-click location. If the goal of the map is to get someone to call a provider for service, our bias should be to include all of the potential providers in the general area, rather than giving potential customers a method to self-disqualify. That is, we want to cast a wider coverage net, rather than one too narrow. The problem with this approach is that it will create a number of false positive Broadband reports. As of this date we cannot determine if the claims of inaccurate coverage in online maps are due to the looser provider view standard or not. We keep this looser standard in place to minimize the likelihood of self-disqualifications.

Appendix One-Idaho

Community Anchor Institutions

Collecting broadband availability data at Community Anchor Institutions (CAIs) in Idaho has demonstrated to be a complex process. In a state characterized by such a diverse geography and spread out rural communities it is challenging to identify a defined outreach strategy that would encourage CAIs to participate in the Broadband Program. The mapping team continues to focus on collecting CAIs' broadband access information with a flexible and creative approach that attempts to address the particular situations of CAIs. The team expects that this approach will lead to the establishment of sound communication with CAIs, improved responses to survey questions and therefore that the data collected will better inform policy makers and support the broadband planning process.

The work performed in the previous six submissions has yielded a comprehensive dataset of CAIs in Idaho. For Round 7 our efforts focused on actively reaching out to Public Safety Institutions to encourage their participation in the State Broadband Mapping Program. Additionally, we explored alternatives for improving the users' experience when taking the online survey. Our objectives for the current submission were:

Collaborate with municipality officials and public safety managers at the local government level to encourage them to participate in the State Broadband Mapping Program.
Raise awareness of the broadband mapping initiative to relevant organizations associated with the CAI categories such as Idaho Sheriff's Association and Idaho Fire Chiefs Association.
Develop a platform to collect broadband connectivity information from CAIs that incorporates a web map application showing their locations.

CAI Philosophy

The work performed for this submission was guided by three principles:

First, CAIs are important stakeholders within the planning process and are traditionally active participants in their communities. The challenge is to encourage CAIs to include broadband accessibility in their discussions as a means to improve their services to the community. It also allows broadband planning to tie into existing organizational and planning networks.

Second, CAIs will likely be one of the primary beneficiaries of targeted broadband funding. Some CAI categories are especially positioned to perform the dual functionality of 1) availing on the extended applications offered by broadband to improve the efficiency of the services they provide to the community (e.g., improved emergency planning, management and response, better medical services, etc.) and 2) providing a portal for people to access the increasing number of applications available through broadband (e.g., online training; job postings, goods and services, etc.)

Third, we continue to use a rational and targeted approach to derive information. This means that a goal of our CAI process is not an exhaustive census of anything that could be a CAI; rather, it is the

discovery, inventory and integration of Broadband planning activities into those CAIs that stand to produce the greatest synergies with the SBI planning process.

Based on these principles, the team directs its efforts to integrate broadband mapping in the ongoing fabric of the communities. We want to support CAIs to be able to become active voices in their communities to encourage the inclusion of broadband in the community planning processes.

Anchor Institution Outreach

For this submission we mapped broadband availability at CAIs using methods that have proven to provide the highest response rates in previous rounds. We intensified the outreach campaign by means of direct communications with CAI managers and IT personnel; we availed on several opportunities to increase awareness of the State Broadband Mapping Program among relevant CAI managers; and we continued to collaborate with CAI organizations and associations to remind their constituents to actively participate in the program. Additionally, we strived to improve the effectiveness of the online survey with the goal of increasing the relevance of the SBI program in the perceptions of CAI managers.

Another important aspect of this data collection round was improving the physical location of public safety institutions based on authoritative data. We acquired structures datasets, including public safety facilities, from County GIS managers and the Idaho Department of Water Resources (IDWR). This information was used to verify and when necessary edit and update the geographic coordinates of the institutions in our inventory. We added 111 Fire and Police stations statewide as a result of our efforts and we minimized duplication of efforts with IDWR. Further research was done to obtain information about contacts at these institutions that would be most appropriate to provide broadband information for the project. It was interesting to note that most of the contacts for Fire and Police Departments in rural areas did not have an email address so the primary way to contact them was by phone. A final method for outreach to CAIs was a third party email-marketing service used to invite 127 contacts to fill out the on-line survey regarding broadband connectivity.

A presentation of the summary and status of the CAIs data collection project was given at the Broadband Summit in Idaho Falls, ID. The objective of this presentation was to increase awareness about the project among broadband planners in the state as well as develop partnerships that could lead to improved efficiency of the data collection process. During this Summit communications were initiated with the Idaho Office of Community Partnership (OCP) as well as the Public Safety Communications Department. The conversations focused on exploring collaborative approaches to substantially increase the exposure of SBI projects among Community Anchor Institution representatives in the public safety realm. This presentation also opened a line of dialog with the BTOP manager and the Idaho Commission for Libraries, which allowed us to obtain connectivity information and update the contact information for 57 libraries in our database.

A second presentation was given at the North Idaho Regional Resource Center meeting to raise awareness about the SBI project amongst GIS managers in the northern counties. This outreach effort was based on the understanding that GIS managers at the local level can provide the most up-to-date authoritative information about the location of CAIs and they in many instances work in close

collaboration with Emergency Management Coordinators. The attendants were encouraged to pass on this information to relevant contacts within their jurisdictions.

As mentioned earlier, great effort was invested in designing improvements for the current online survey with the goal of leveraging the infrastructure currently in place, adding a spatial component, and maintaining data security. We explored several alternatives and decided that the best option would be to develop a web map application in JavaScript API that connects to an Enterprise Geodatabase hosted by the State of Idaho. This new process allows CAI managers to locate their institution and edit connectivity information directly in the map. This tool is still under development and is expected to be ready by July 2013.

We have also established working relationships with teams working on similar projects in other states to provide opportunity for collaboration as we continue to look for ways to improve outreach to CAIs to meet the goals of the SBI program.

Anchor Institution Trends

To date we have focused our efforts on identifying Community Anchor Institutions, verifying physical address information for the institutions and seeking connectivity data from the institutions. During this round we have placed a priority on reaching out to public safety institutions and libraries.

We have identified two trends in the public safety category that present important challenges: 1) Institutions in this CAI sector are not motivated to respond to our outreach efforts and 2) Contacts are reluctant to participate in the State Broadband Initiative because they consider that providing their information could increase their vulnerability to cyber-attacks.

Our approach to overcome the first challenge has been to explore alternatives to increase the relevance of the project to Fire and Police Chiefs and their personnel. We hypothesized that including a visual spatial component to the survey will allow us to more efficiently convey the direct and indirect benefits of broadband. These institutions may be more willing to invest time in the SBI program if they can see how it will benefit them and how the information they provide is being used. Furthermore, we expect that this new method will allow us to visually portray the degree of collaboration with these particular groups and act as a motivating factor with other CAI groups. The second challenge seems to be more complex as cyber security experts at the State of Idaho have confirmed that the security concerns expressed are valid. Based upon our understanding, similar comments have been made by other grantees when discussing Public Safety connectivity. We look forward to guidance for a resolution.

We will continue to investigate new options for data collection that will assist us in meeting the overall program goals.

Appendix Two

Data Collection Challenges

This section summarizes some of the challenges we have experienced with data collection and processing. The team believes it is important to categorize these challenges as they help inform the geoprocessing and verification methods used. It is also our hope that some of the more global issues can be discussed and decided within the Grantee community.

We begin with several global issues and then continue toward more granular challenges.

Global Data Collection Issues

Maximum Advertised Speed is Not Reported Consistently

As has been discussed in webinars and also within the context of NTIA data assessments, much reported speed information continues to be reported at the market level (MSA/RSA) and then uniformly pushed down to the Census blocks. This has a tendency to create a problem with NTIA speed tripwires since the technology is reported by block but the maximum advertised speed is reported at a regional level.

This challenge gets further amplified at a block level when comparing to a third party data provider. It can create a mismatch between third party data generated at an area larger than block level versus block level generated speed and vice versa. To minimize the potential confusion, it might be helpful to be able to provide a flag at the submitted record level which indicates the geographic basis by which the Maximum Advertised Speed is reported.

Census Block and Road Standards are not clear

There seem to be several methods by which providers are calculating the Census block area. So the distinction at 2.00 square miles can be uniform, it would be ideal to articulate an operational area calculation definition.

Providers Not Wishing for Block Level Aggregation of Their Data

For providers who submit address point data, we do minimal additional processing. Our main test is to ensure that points are contained within 1 mile of exchange boundaries; the only other processing was normalization into NTIA formats.

Broadband providers not Meeting the NOFA "provider" Definition

Comments on PBWorks appear to reflect a concern among a number of grantees about what a Broadband provider is--and how that definition impacts mapping.

If the 7-10 day provisioning rule is to be strictly enforced, it could seem to eliminate a number of prominent Broadband providers[28]. Further, the need for clarification around a facilities-based provider,

[28] By email ***REDACT*** informed us they could not provision in 7-10 days, but they also supply information on qualified locations to the address point level. Therefore, we draw a distinction between an incumbent provider owning the facility--which terminates at a customer premise--who cannot turn up service at a qualified location, versus a provider not reporting any specific qualified locations in which they cannot turnup service in the 7-10 day

versus the reseller, has injected even more uncertainty. Right now we are unclear on how strictly to interpret either of these important distinctions, but we are concerned that we are beginning to create an NTIA exclusion criterion that is going to confuse downstream consumers of the data.

Given mergers and acquisitions in the CLEC space we are noticing a drop off in participation in this program by several national CLECs. We hope this is an artifact of the mergers and resource constraints rather than a long term trend.

Again, we do not want to exclude a service provider, but we believe there needs to be further clarification around the "7-10 day rule," the definition of a "reseller," and better interpretation of facility-based providers, versus equipping UNEs, SpA or leased lines.

We have used the provider Type of "Other" to classify a number of providers who offer Broadband services, but we do not offer them in a manner consistent with Technical Appendix A definitions.

To What Extent Should We Begin "Classifying" the Data and Maps?

The question immediately preceding gets to the intent of a Broadband provider. This question gets to the intent of the Data and Maps.

Earlier in this document we discussed the question of what type of bias we should introduce to our online map messaging. In an online environment, do we want to more likely create an overstatement of coverage for a provider than an understatement? In other words, is the larger problem allowing a consumer to self-disqualify, versus calling a number of neighboring providers? There is a related issue to this. Clearly in our maps there is a lot of scatter in data that we believe should be more continuous. These are the islands of coverage from an incumbent provider[29]. There are a number of processes that could be put in place to deal with this type of scatter, but without more information from the service provider-- essentially the last mile facilities-- it will be difficult to perform this clean up in an informed manner. On the one hand, we can aesthetically clean the maps up and reduce the scatter, but we have little sub-block engineering information upon which to make this decision. Right now our preference is to put out a somewhat aesthetically messier deliverable and work with providers to get better information to clarify their submission. If that isn't forthcoming, we are limited in what can be done given the lack of facility level information. In summary this yields two questions

In our online maps should we error on overstating coverage to prevent consumer self-disqualification?
In our online maps should we work to clean up a lot of the scatter that we see without having facility-based evidence from which to remove it?

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window. In the first case we have a sense of where service can be offered and verified. In the second, we have no evidence that a service could exist there until a specific location becomes a customer.

[29] For a provider who sells opportunistically (not within a franchise area) it becomes even more problematic to classify their coverage because the points are more related to the type of consumer purchasing the service than a bounded offering. In a matter of speaking, the ProviderType is more determined by the technology and/or location than a type of business. The core intent of the NOFA and our grant application was centered around the 7-10 day providers but we believe maintaining information on provider Type "Other" and "Reseller" is important to assist in validation and market segment analysis as resources are available.

As we examine results from third party data assessments, it appears that this scatter is something that is also problematic with the assessment results. It also appears to be evident that different third party data sources treat water areas differently. When we are developing data based upon Wireline facilities, we exclude water blocks. We do not filter out water blocks from provider submitted data. We are unsure if there is or should be a standard in how water covered blocks are treated for Wireline broadband providers.

Community Anchor Institution Surveys

Over time the base of participation in CAI surveys has broadened. Our teams are interacting with more organizations interested in broadband planning. This is a benefit because it helps integrate the importance of Broadband mapping, planning and capacity building within their organizational framework. But it also begins to create challenges in data collection. There are two noticeable trends in this area.

First, CAIs are organizationally diverse. For a school, you expect to have a centralized entity that can answer and support questions about Broadband services. For a rural, volunteer fire department answering questions about broadband may go to the Chief. The way that he/she answers about Broadband is probably specific to her experience and context. The implication is two-fold. First saying that some percentage of CAIs in a state have access to broadband can be misleading because the formality of a school or government building is much different than the formality of a volunteer fire department. Second, that volunteer fire department may get broadband via a 3G mobile hotpsot when they need it…but the presence of *this* type of broadband is a very different thing than the presence of a responder who has mobile LTE broadband.

Second, technical knowledge of the survey respondent differs within each organization. This complicates our data collection. It is not uncommon for someone to say yes we have Broadband, I just don't know how we get it or how fast this is. So in response we report they are broadband served but unknown speed or technology. This doesn't mean they haven't been surveyed, it just means the response was unknown. As there are now a large number of people collecting this data, it would be helpful to have some consistent national business rules from which we can answer questions about the meaning of any particular data element. As an example, when should "no" be used versus when should "unknown "be used. In other words, what is the standard for the difference between never made contact with the CAI versus a respondent didn't know/couldn't answer. We have guidelines internally but are unsure if this is consistent across states.

Granular Data Collection Issues

Non-Uniform Submission Standards

It is clear among providers that there isn't a consistent method used to derive Broadband coverage. Some providers appear to be use a geocoding approach and then point in polygon or point on segment process. Others may be using GPS locations. In some cases, it is difficult to infer what reference data was used to georeference plant (is it the carrier's roadbase?). This leads to uncertainty regarding the input data scale or accuracy relative to other base layers. Although we may be trading off absolute

accuracy, our standard has been to conflate submitted data to TIGER 2010 Blocks and TIGER 2010 roads. We perform our verification against this conflated data product.

Temporal

We are unsure of how well the data are temporally consistent. Some providers gave us their best effort to control to the requested survey date. We note that some providers were clear that the submission was as of extract date without any way to move back in time. They have no means to control for time and cannot provide any audit support beyond when the data are released to us. Some data-especially loop qualification data-may change from day to day. It will be very difficult to clarify why something was changed from a given point in time.

Perceived Inaccuracy with Respect to Internal Standards

The NOFA is clear on submitting a list of Blocks in which a provider delivers Broadband service. This is a different objective than perfectly reflecting service territories. If a firm's accuracy standard is a reflection of their service area, then the data created under the NOFA will not meet their perception of accuracy. This leads to two other issues: First, using Census Blocks rather than serving area may overstate or understate a particular provider's Broadband serving area. This was a significant concern of ***REDACT*** who specifically required us to submit only address-level qualification data. The second issue this brings up is how or if, there should be some standard on how much of a Census Block needs to be covered to call it covered.

Confidentiality

Several providers have noted concerns with CPNI-related issues and have stated this as a reason for non-participation. We have also heard expressions of comparable concern regarding identifiable responses to Anchor Institution information.

Unclear on Definitions

As discussed earlier, several providers claimed confusion on several key terms involved in Middle Mile. We note a consistent stream of questions around the interpretation of Maximum Advertised Speed. Some providers understand this to be the most common speed package bought within the mass market, while others view this as a speed that can be purchased for an additional cost above a mass market offering (e.g. a Turbo option for an additional fee per month). Others interpret this as the fastest speed that is available for that particular location--in terms of xDSL, a structure qualified speed, for example.

Perception of Data Use

There seems to be some hesitancy releasing speed information because no one is sure of how the information will be used, or what the speed is intended to reflect. A number of providers have verbally indicated that typical speed will be about (on average) 80% of purchased speed due to overhead. But there are many other factors (such as a user's home network) that influence speeds measures. Providers are concerned about introducing statistics without a clear understanding of how those statistics are derived and will then be used. Also, as advertised speed is pushed down to a block level, we sense more trepidation to report speed values. This quickly begins to touch on parity across network types (why is wireline down at the block when wireless is half the state, etc.). Finally we note a

significant increase in speed values reported to us. This may be due to network upgrades or competitive concerns to match the theoretical network speed.

Location Uncertainty In Source Data

Within this document we have noted concerns about the impact of source data accuracy. Our geoprocessing methodology provided what we believe is a relatively conservative tolerance to account for the scale issue in the source data, but we are unsure of how this may impact downstream users. Clearly, it also impacts the verification process because we can't attempt to verify received data beyond a scale at which it was developed.

Covered Segment Process

Deriving Broadband covered segments in Census Blocks greater than 2 square miles has proved to be a challenge. Moving from a NOFA specified tabular deliverable to a requested geographic deliverable also increases the complexity of the effort.

Record Level Metadata

It would be helpful to have one or two additional fields in each feature class transmitted to NTIA. One User Defined field could be helpful as an expression of record level confidence. The second field could be used as a Key between the transfer geodatabase and our systems. Ideally, both fields could be large text fields (50 char) so the Grantee can use them to express a variety of attributes.

Miscellaneous Data Collection Notes

We note the following important observations regarding our data submission:

There are Middle Mile plant records for providers who are not present in the Census block, segment or wireless area feature classes. This is due to classification as non-NOFA Broadband providers.
In some cases, we have trimmed wireless coverage estimates to honor state boundaries.
We believe some providers are trimming their coverage to honor license area boundaries.
Where a provider submitted Middle Mile points out of state, we are no longer passing those points to NTIA as they fail the validation script.
In tables with mandatory Street and Zip5 attributes (Service Address), if the value is unavailable we fill the default value.
As before there remain some differences between the Data Model, Data Model Default Values and the Python Validation Script.
We have a significant amount of VDSL, ADSL 2 and ADSL 2+ coverage categorized into the xADSL category. This introduces large variance in speed availability as some providers are using VDSL, shortened loops and/or pair bonding to increase speed to levels nearly 30 Mbps.
We note a few providers who have speeds seemingly inconsistent with their technology of transmission. This is either very low speeds with optical fiber, or very high speeds with non DOCSIS 3.0 systems. We have verified on provider websites that the reported speeds are available in the area but these speeds will fall out of the NTIA frequency table analysis.
We have a small number of providers who serve an area with both a residential and business speed tier. In cases where we cannot distinguish which speed tier offering to use, we use the higher of the speed tiers.

Per NTIA request we have modified the manner in which we handle Wireless coverage polygons. If a Provider submits a single geometry but specifies multiple spectrum codes in use in that polygon, we duplicate the polygon for each spectrum code. In other words the geographic object is identical but the attribute data for the object is unique.

In point level data submissions (Service Address and CAI) we note points that are spatially coincident. With respect to Service Address points our thought is these represent multi-unit dwellings or businesses but we don't have enough address detail to determine if these are multi-unit structures or duplicated customers. Because we cannot determine the reason for the duplication we leave spatially coincident records in our submission. We also leave in our CAI submission points which may be the same physical structure but have slight variations in addressing.

In point level middle mile data, we are finding a variance in the quality of the geocoded longitude and latitude returned. Given the data received we are unsure if this is an issue where the plant address is difficult to geocode or if the longitude and latitude provided to us is different than what would be returned in geocoding.

For Block and Segment level data which we produce based upon provider facility or service area boundaries, we remove Census blocks which are entirely water covered. This results in a drop of Census block counts for a number of providers.

Appendix Three

This appendix contains the confidentiality clarification supplied in a series of emails between CostQuest and NTIA.

Feature Class	*Metadata*	*NOFA Confidential?*	*Online Map*	*Public Disclosure*	*Exemption*
Last Mile	Constraints on accessing and using the data	Yes	No	No	None
	Access constraints: None				
	Use constraints:				
	This data is confidential as defined in the NOFA.				
Middle Mile	Constraints on accessing and using the data	Yes	No	No	None
	Access constraints: None				
	Use constraints:				
	This data is confidential as defined in the NOFA.				
Service Address	Constraints on accessing and using the data	No	No	Yes	
	Access constraints: None				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
CAI	Constraints on accessing and using the data	No	Yes	Yes	NO attributes on any record in this feature class are considered confidential

	Access constraints: None				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
Census Block	Constraints on accessing and using the data	No	Yes	Yes	NO attributes on any record in this feature class are considered confidential
	Access constraints: None				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
Service Overview	Constraints on accessing and using the data	No	Yes	Yes	The only provider who may not show up on this table is a provider who has provided only confidential data (last mile, Middle Mile,

					address point with provider name)
	Access constraints: None				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
Road Segment	Constraints on accessing and using the data	No	Yes	Yes	NO attributes on any record in this feature class are considered confidential
	Access constraints: None.				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
Wireless	Constraints on accessing and using the data	No	Yes	Yes	NO attributes on any record in this feature class are considered confidential
	Access constraints: None				
	Use constraints:				

	There are no restrictions on distribution of the data by users

Appendix Four-Idaho

This appendix details our analysis of the potential and actual broadband provider market. We include both our internal tracking description document and then our categorization for each provider. As this extract was made prior to final submission, there may be differences between provider categorization and the attributes on the day of submission to NTIA.

Provider Categorization

Provider Type and Status Definitions

The Provider Type is based upon categories provided by NTIA, while the Provider Status is based upon categories developed internally for tracking purposes. It should be noted that the Provider Status discussed here relates to the provider's overall status within the program.

Provider Type Codes and Definitions:

NTIA code	Code	Name	Definition
1	P	Provider	This code applies to all confirmed providers of broadband service per the SBI program NOFA. A provider is given a "P" designation if we have determined that the company does indeed exist and appears to be providing broadband services.
2	R	Reseller	This code applies to all broadband entities that have been confirmed as pure resellers – meaning they do not own their own facility/equipment and simply resell services under their own brand name or the brand name of an actual Provider.
3	O	Other	The code applies to entities who were originally placed on the SBI provider list, but whose status is still in question or has been determined to be non-NOFA compliant.
	N/A	Not applicable	This code applies to entities who appeared on the original state provider list or a third party list (such as the FCC 477, American

4			Roamer, or Warren Media lists) but who have been confirmed as NOT providing broadband services.
	X	Inactive	This code applies to entities that may have appeared on an early provider list but whose identity and existence we subsequently have been unable to verify. This code may also apply to providers who have since been acquired or simple gone out of business and for which no FRN appears on the FCC list – These no longer need to be reported to NTIA. This is an INTERNAL category used to remove entities completely from the list of entities submitted to NTIA.

Once the proper Provider Type has been assigned to an entity, an overall Provider Status must be established. The Provider Status codes are specific to the Provider Types, and are not interchangeable. The following table lists the status codes associated with each Provider Type.

Provider Status Definitions

Provider Type Code	Provider Status Code	Name	Definition
P	D	Declined	A provider is given a Status of "D" if they have officially stated verbally or in writing that they will not participate in the SBI program.
	P	Participating	A provider is considered to be "Participating" if they have submitted USABLE data in at least one data submission round. The data does not need to be 100% complete for a provider to be assigned a "P" code – they simply have to have provided a level of data that is sufficient to submit to NTIA.
	NR	Non Responsive	A provider is considered "Non Responsive" if they have either failed to respond to any of our correspondence, or they have submitted insufficient data that makes inclusion of their data in the NTIA submission impossible.
	V	Submitted under other ID	A provider whose data is submitted under another Provider ID, but is operating under their own FRN.
	E	Estimated	A provider is marked as "Estimated" if they have not submitted usable data, and would otherwise be considered non-responsive, BUT for whom we are able to submit data by using estimation techniques and/or third party sources. This designation applies only to providers whose data is 100% estimated.
R	R	Reseller	"R" is the only status code for Resellers and it simply reconfirms their status as a reseller –data may not be submitted but name of provider is included in NTIA data package.
O	U	Unknown	The status of Unknown is assigned to an entity whose name has appeared on a list (or been submitted as a new possible provider) and is currently under investigation. It has not been determined yet if this entity is indeed offering broadband services or not.
	NC	Non-Compliant	This status is assigned to entities who appear to be in the broadband industry, but who do not meet the formal definition of a BB provider under NOFA requirements. Examples may be entities who cannot provision service within 7-10 days.

	P	Participating	These are providers who do not meet the formal definition of a BB provider under NOFA requirements, but are participating in the program and submitting data.
	NP	Not a Provider	This status applies to entities who may appear on a third partly list of valid providers, but who have been proven to either no longer exist, or simply no longer provides broadband services.
N/A			No status codes associated with this Provider Type
X			

Provider Disposition

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
116	ID	CTC Telecom	CTC	CTC Telecom	P	P
117	ID	Custer Telephone Cooperative, Inc.	Custer Telephone Cooperative, Inc.	Custer Telephone Cooperative Inc.	P	P
118	ID	Direct Communications	Direct Communications	Direct Communications Rockland, Inc.	P	P
119	ID	FairPoint Communications	FairPoint Communications	FairPoint Communications, Inc.	P	P
120	ID	Farmers Mutual Telephone Company	Farmers Mutual Telephone Company	Farmers Mutual Telephone Company (ID)	P	P
121	ID	Filer Mutual Telephone Company	Filer Mutual Telephone Company	Filer Mutual Telephone Company	P	P
122	ID	Inland Telephone Company	Inland Telephone Company	Western Elite Incorporated Services	P	P
123	ID	Midvale Telephone Exchange, Inc.	MTE Communications	Midvale Telephone Exchange	P	P
124	ID	Mud Lake Telephone Cooperative Association, Inc.	Mud Lake Telephone Cooperative Association, Inc.	Mud Lake Telephone Cooperative Assn., Inc.	P	P
125	ID	Oregon-Idaho Utilities, Inc.	Oregon-Idaho Utilities, Inc.	Robinson Communications Corporation	P	P
126	ID	Project Mutual Telephone Cooperative	Project Mutual Telephone Cooperative Association, Inc.	Project Mutual Telephone	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
		Association, Inc.				
127	ID	Martell Enterprises, Inc.	Rural Telephone Company	Martell Enterprises, Inc.	P	P
128	ID	Silver Star Telephone Company, Inc.	Silver Star Communications	Silver Star Telephone	P	P
129	ID	CenturyTel, Inc.	CenturyLink	Qwest Communications International, Inc.	P	V
130	ID	Frontier Communications	Frontier Communications of Northwest Inc.	Frontier Communications Corporation	P	P
131	ID	CenturyTel, Inc.	CenturyLink	CenturyTel, Inc.	P	P
132	ID	Citizens Telecommunications Company of Idaho	Frontier Communications of Idaho	Frontier Communications Corporation	P	P
133	ID	Telephone and Data Systems, Inc.	TDS TELECOMMUNICATIONS CORPORATION		P	V
134	ID	T-Mobile USA, Inc.	T-Mobile	Deutsche Telekom AG	P	P
135	ID	Bresnan Internet	Bresnan Internet		N/A	NP
136	ID	Cable One	Cable One	Cable One, Inc.	P	P
137	ID	CoxCom, Inc.	Cox Communications	Cox Communications, Inc.	P	P
138	ID	Direct Communications Cable	Direct Communications	Direct Communications Rockland, Inc.	P	P
139	ID	Dish Network	Dish Network	Dish Network	R	R
141	ID	Silver Star Broadband	Silver Star Broadband	Silver Star Telephone	P	P
142	ID	Suddenlink Communications	Suddenlink Communications	Cequel Communications, LLC	P	P
143	ID	Superior Satellite	Superior Satellite		R	R
144	ID	Troy Cable	Troy Cable		P	NR
145	ID	Mullan Cable	Mullan Cable	Mullan Cable TV Inc.	P	P
146	ID	Northland Cable Television	Northland Cable Television	Northland Communications Corp.	P	P
147	ID	Windjammer Cable	Windjammer Cable	Windjammer Communications LLC	N/A	NP

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
148	ID	A & W Satellite	A & W Satellite		R	R
149	ID	Coeur d`Alene Tribe	Red Spectrum Communication	N/A	P	P
151	ID	Leader Communications Services (St. Maries Wireless)	Leader Communications Services (St. Maries Wireless)		P	NR
152	ID	Wired Or Wireless, Inc.	AIR-PIPE	Wired or Wireless, Inc.	P	P
153	ID	All Idaho Internet	All Idaho Internet		R	R
154	ID	Big Sky Telecom	Big Sky Telecom		R	R
155	ID	BitSmart	BitSmart	N/A	P	P
156	ID	Convertec Internet Services	Convertec Internet Services		N/A	NP
157	ID	Datawav-is	Datawav-is		X	
158	ID	Digi-Comm	Digi-Comm		X	
159	ID	Direct Communications - wireless	Direct Communications		P	V
161	ID	Pass Word PKA - Fastlane-i.com	Pass Word, Inc.		N/A	NP
162	ID	First Step Internet, LLC	First Step Internet	First Step Internet, LLC	P	P
163	ID	St. Maries Gazette Wireless	St. Maries Gazette Record		P	V
164	ID	Gem State Communications	GSC Wireless	N/A	P	P
165	ID	JAB Broadband - DIGIS	JAB Broadband - DIGIS		P	V
166	ID	Imbris, INc.	Imbris, Inc.		N/A	NP
167	ID	Inland Internet	Inland Internet		P	V
168	ID	Intermax Networks	Intermax Networks	Newmax, LLC	P	P
169	ID	Ispeed Wireless	ISpeed Wireless		P	NR
170	ID	DIGIS	Last Mile Wireless		P	V
171	ID	LTLink	Family Friendly Internet Service		P	NR
172	ID	Meadow Creek Computer Works	Meadow Creek Computer Works		R	R
173	ID	Microserv	Microserv		P	NR

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
174	ID	MicroWave DSL (HIBEK.Net)	MicroWave DSL		P	D
175	ID	NIDAHO.NET	North Idaho Connection		P	NR
176	ID	Overarch Broadband	Overarch Broadband		P	NR
178	ID	Ptera Wireless Inc.	Ptera	N/A	P	P
179	ID	QROIdaho	QRO High-Speed Internet of Idaho	N/A	P	P
180	ID	SafeLink Internet	Safelink Internet	Safelink Internet	P	P
181	ID	SISNA (dialup)	SISNA		N/A	NP
182	ID	SpeedyQuick Networks	SpeedyQuick Networks		P	NR
183	ID	Spokane Skynet	Spokane Skynet		O	S
184	ID	Surf1	Surf1		P	NR
185	ID	Teton Wireless	Teton Wireless		N/A	NP
186	ID	Wilderness Wireless	Wilderness Wireless	N/A	P	P
188	ID	Sky Blue	Sky Blue		O	S
189	ID	Clearwire	Clearwire	Clearwire Corporation	P	P
191	ID	St. Maries Gazette Record	St. Maries Gazette Record	N/A	P	P
527	ID	Comcast of California Idaho, Inc.	Comcast	Comcast Corporation	P	P
638	ID	Cambridge Telephone Company, Inc.	Cambridge Telephone Company, Inc.	Cambridge Telephone Company, Inc.	P	P
645	ID	Megapath, Inc.	DSLNet Communications, LLC		N/A	NP
651	ID	Sprint Nextel Corporation	Sprint	Sprint Nextel Corporation	P	P
653	ID	Time Warner Cable LLC	Time Warner Cable	Time Warner Cable Inc.	P	P
660	ID	Level 3 Communications, LLC	Level 3 Communications, LLC	Level 3 Communications, LLC	P	P
661	ID	AT&T Mobility LLC	AT&T Mobility LLC	AT&T Mobility	P	P
666	ID	ViaSat, Inc.	ViaSat Communications	WildBlue Communications, Inc.	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
671	ID	Custer Telephone Broadband Services LLC.	Custer Telephone Broadband Services	Custer Telephone	P	P
674	ID	New Edge Holding Company - Earthlink	New Edge Network, Inc.	New Edge Holding Company	O	NC
678	ID	American Fiber Systems, Inc.	American Fiber Systems	Zayo Group, LLC	O	NC
679	ID	360 Networks	360 Networks		O	NC
686	ID	DigitalBridge Communications	Bridgemaxx	DigitalBridge Communications Corp.	N/A	NP
687	ID	JAB Broadband - DIGIS	JAB Broadband - DIGIS	JAB Wireless, Inc.	P	P
690	ID	OneEighty Networks	OrbitCom, Inc.	OrbitCom, Inc	P	NR
695	ID	Electic Lightwave, LLC	Integra Telecom	Integra Telecom Holdings, Inc.	P	P
696	ID	Syringa Networks, LLC	Syringa Networks, LLC	Syringa Networks, LLC	P	P
704	ID	Asotin Telephone Company	TDS		N/A	NP
705	ID	Potlatch Telephone Company	TDS	Telephone and Data Systems, Inc.	P	P
713	ID	Verizon Wireless	Verizon Wireless	Verizon Communications Inc.	P	P
716	ID	Elk River TV Cable Company	Elk River TV Cable Company	Elk River Cable TV Inc.	N/A	NP
722	ID	Columbine Telephone Company, Inc.	Silver Star Communications	ATC Communications	P	P
723	ID	Gold Star Communications LLC	Silver Star Wireless	Silver Star Telephone	P	P
729	ID	Leap Wireless International, Inc.	Cricket Communications, Inc.	Leap Wireless International, Inc.	P	P
737	ID	PAETEC Holding Corp	McLeodUSA Telecommunications Services, Inc.	PaeTec Corporation	N/A	NP
740	ID	Idaho Regional Optical Network	IRON		O	P
754	ID	Country Cable	Country Cable	Country Cable	P	NR

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
759	ID	tw telecom of Idaho llc	tw telecom	tw telecom inc.	P	P
766	ID	Westcom LLC	Westel Fiber	WestCom LLC	P	P
768	ID	Nez Perce Tribe	Nez Perce Tribe	N/A	P	P
769	ID	Fretel	FairPoint Communications	FairPoint Communications, Inc.	P	P
779	ID	Millennium Networks	Silver Star Broadband	Silver Star Telephone	P	P
802	ID	Atlantic Tele-Network	Allied Wireless Communications Corporation	Atlantic Tele-Network	P	NR
803	ID	Craner Technology Services	Craner Technology Services	Craner Technology Services	P	P
804	ID	GreenFly	Clearfly	Greenfly Networks, Inc.	R	R
805	ID	HNS License Sub, LLC	Hughes Network Systems	Hughes Communications, Inc.	P	P
806	ID	Rural Network Services (Owned by Midvale Tel)	MTE Communications	Rural Network Services	P	P
807	ID	StarBand Communications Inc.	StarBand Communications Inc.	StarBand Communications Inc.	P	P
808	ID	XO Holdings, Inc.	XO Communications, LLC	XO Holdings, Inc.	R	R
829	ID	Chickadee Wireless	Chickadee Wireless	N/A	P	D
830	ID	Concept Cable TV	Concept Cable TV	N/A	P	P
832	ID	MediaG3, Inc.	Imperial Wireless	N/A	P	NR
836	ID	Speed Connect	Speed Connect		P	P
838	ID	Skycasters, LLC	Skycasters, LLC		P	P
845	ID	Syringa Wireless	Syringa Wireless	Syringa Wireless	P	NR
851	ID	Access Spectrum	Access Spectrum	Access Spectrum	N/A	NP
855	ID	Atlantic Wireless LP	Atlantic Wireless LP	Atlantic Wireless LP	N/A	NP
858	ID	Blackfoot Telephone Cooperative Inc	Blackfoot Telephone Cooperative Inc	Blackfoot Telephone Cooperative Inc	N/A	NP
859	ID	Cache Valley Wireless	Cache Valley Wireless	Cache Valley Wireless	N/A	NP

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
862	ID	Cavalier Wireless, LLC	Cavalier Wireless, LLC	Cavalier Wireless LLC	N/A	NP
868	ID	Cleartalk	Cleartalk	Cleartalk	N/A	NP
872	ID	Continuum 700 LLC	Continuum 700 LLC	Continuum 700 LLC	N/A	NP
888	ID	Idaho City Cable TV	Idaho City Cable TV	Idaho City Cable TV	N/A	NP
894	ID	Manti Telephone Company	Manti Telephone Company	Manti Telephone Company	N/A	NP
896	ID	Metro PCS	Metro PCS	Metro PCS	N/A	NP
899	ID	MTPCS License Co., LLC	Cellular One	MTPCS LLC	O	U
908	ID	Qualcomm	MediaFLO	Qualcomm	N/A	NP
916	ID	SpectrumCo	SpectrumCo	SpectrumCo	N/A	NP
923	ID	Toba Inlet PCS, LLC	Toba Inlet PCS, LLC	Toba Inlet PCS, LLC	N/A	NP
924	ID	U. S. Cellular	U. S. Cellular	United States Cellular	N/A	NP
925	ID	Union Telephone Company	Union Telephone Company	Union Telephone Company	N/A	NP
930	ID	Western Communications Inc.	Western Communications Inc.	Western Communications Inc.	N/A	NP
931	ID	Whidbey Telephone Company	Whidbey Telephone Company	Whidbey Telephone Company	N/A	NP
938	ID	Zito Media	Zito Media		P	P
951	ID	H.J. L.L.C.	Big Dog High Speed Internet		P	P
120000	ID	AT&T Inc.	New Cingular Wireless Services, Inc.		P	V
120002	ID	Cactus International, Inc.	Cactus Computer		P	D
120003	ID	CommWorld	CommWorld		P	NR
120005	ID	First Step Internet, LLC	GLOBAL CROSSING TELECOMMUNICATIONS, INC.	Global Crossing North America, Inc.	R	R
120008	ID	Inland Cellular Telephone Company	Washington RSA No 8 Limited Partnership		P	V
120009	ID	KeyOn Communications	KeyON Communications		X	

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
		Holdings, Inc.	Holdings, Inc.			
120010	ID	Level 3 Communications, LLC	Broadwing Communications, LLC		P	V
120011	ID	Metropolitan Telecommunications Holding Co	Metropolitan Telecommunications Holding Co		R	R
120012	ID	Rural Network Services (Owned by Midvale Tel)	Rural Network Services		N/A	NP
120014	ID	Stat Network Solutions	Stat Network Solutions		N/A	NP
120015	ID	Stratos Global Corporation	Stratos Offshore Services Company		O	S
120017	ID	Verizon Business Global LLC	Verizon Business	Verizon Communications Inc.	O	NC
120020	ID	Zayo Bandwidth Northwest, Inc.	Zayo Group, LLC (FiberNet)		O	NC
120023	ID	JAB Broadband	Jab-Skybeam		N/A	NP
120027	ID	Advanced Cable Technology	Advanced Cable Technology		N/A	NP
120029	ID	Cache Broadband	Cache Broadband		N/A	NP
120031	ID	Laser Image Inc	laser Image Inc		N/A	NP
120056	ID	RTI-Rural Telecom	RTI-Rural Telecom		N/A	NP
120057	ID	Reallinx, Inc.	Reallinx, Inc.	Reallinx, Inc.	R	R
120058	ID	Cogent Communications Group	Cogent Communications Group	Cogent Communications Group	O	NC
120059	ID	H.J. L.L.C.	Host Idaho / Big Dog Internet	H.J.L.L.C.	N/A	NP
120060	ID	Liberty-Bell, LLC	Liberty-Bell, LLC	Liberty-Bell, LLC	R	R
120061	ID	EarthLink	EarthLink	EarthLink	O	NC
120062	ID	Hughes Computer Services, Inc.	Hughes Computer Services, Inc.	Hughes Computer Services, Inc.	O	U

OFFICIAL APRIL 2013 UPDATE SUBMISSION TO THE NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION UNDER THE STATE BROADBAND INITIATIVE GRANT PROGRAM FOR THE STATE OF ILLINOIS

APRIL 2013

Table of Contents

COVER LETTER

April 2013

Ms. Anne W. Neville
SBDD Grant Program Director
National Telecommunications and Information Administration
U.S. Department of Commerce
1401 Constitution Avenue, NW Room 4716
Washington, DC 20230

Dear Ms. Neville:

Please accept this submission from the Partnership for a Connected Illinois (PCI), the Designated Entity for Illinois.

These artifacts should be found to be compliant with the April 1, 2013, deadline for the semi-annual data update and in accordance with the terms of the July 1, 2009, Notice of Funds Availability (NOFA) and all subsequent clarifications.

This cycle, PCI continued its data-collection activities from broadband providers in the State. This role allows the State to achieve goals with regard to improving broadband access and adoption – which are in turn central objectives of the Partnership for a Connected Illinois. All facets of this data-collection transition, and the activities that flowed from it, are included in the narrative that follows.

If you have any questions about this Data Narrative, please do not hesitate to contact me at 217-816-4151.

Respectfully submitted,

Drew Clark
Executive Director
Partnership for a Connected Illinois, Inc.

INTRODUCTION

The data submission cycle ending on April 1, 2013 marks the fourth round that PCI has held the full responsibility of data collection and publishing for the entirety of the six months. In this round, PCI used creative new strategies in its outreach to the carriers. PCI continued to establish Non-Disclosure Agreements (NDAs) with broadband providers for confidential information. The data that accompanies this narrative contains edited data for 63 out of the 151 carriers included in the submission. This round PCI continued to refine its data verification process through the use of GeoPDF maps and third party data sources. PCI also continued to make improvements to its Community Anchor Institution database through telephone verification of data and a focus on library public Wi-Fi and URL variables, as well as improvements in the schools dataset.

In the spirit of cooperation with the other 55 State Broadband Initiatives (SBIs), PCI was in contact with other states to help its outreach for this cycle. PCI used the National Broadband Map to find if other states had been able to contact and map providers that have never participated in Illinois. Specifically, PCI made contact with CostQuest Associates (AL, WI, ID, and WY), the SBI in Indiana and the SBI in Georgia. PCI also tried to help other states by working with them on providers that cross Illinois' boarder, posting on the SBDD wiki forum website, and participating in webinars held by the NTIA. PCI aspires to be a leader in the SBI world, and to make the National Broadband Map as accurate as possible.

In this round, the Partnership for a Connected Illinois (PCI) took major steps in its three-fold mission to collect and publish broadband data, to ensure broadband access throughout the State, and to maximize broadband's impact. Assuming this data collection role is vital to achieve the State's goals with regard to improving broadband access and adoption. PCI appreciates the assistance provided by NTIA as PCI improved its collection, processing, and verification of broadband data for submission according to NTIA standards.

PCI has continued to refine the Broadband Illinois web site. This consumer-friendly interface allows residents of the State to intuitively access the information collected by PCI – it is a portal to actual speed data, and a tool that consumers can use to verify the data provided by broadband providers. The Broadband Illinois website contains county-level GeoPDFs for each of Illinois's 102 counties, as well as pages for each broadband provider in the State of Illinois. These maps can be downloaded and edited using the TerraGo Technologies toolbar, which will be explained in great depth in various parts of this narrative.

This narrative will summarize the carrier outreach, the data production methods, carrier data verification, and the community anchor institution data. It will conclude with an examination of the Broadband Illinois website and the ways in which PCI is publishing carrier data in a user-friendly manner that allows for feedback from the consumer.

Carrier Outreach

From January 15 - through January 25, 2013, all providers currently in the PCI census block and wireless layers were sent GeoPDFs that displayed their coverage area in the State of Illinois. The GeoPDFs were fully editable by the provider using the TerraGo technologies' toolbar. As part of this e-mail, PCI requested that updated data be submitted to PCI for its Cycle 7 submission to the NTIA and for the update to the Illinois Broadband map. For those providers who had not previously established a Non-Disclosure Agreement with PCI, a copy of PCI's draft version accompanied these maps.

This entire outreach process was tracked on Salesforce, PCI's contact management tool. As maps were created, distributed, and verified, fields were populated in Salesforce to denote that a map that met the approval of the provider had been created. For those providers who did not respond to their initial map request, multiple follow-up e-mail and phone call attempts were made. PCI also tracked whether there would be an update to the data for this submission, what version number of the data PCI would be submitting, and the dates in which an NDA had been established.

This section will explain the way in which PCI conducted its outreach to the carriers and the different ways in which it received data. It will outline some of the major updates that were received in this round as well as describe both quantitatively and qualitatively the extent to which data was updated in this round.

NDA

PCI continues to offer and abide by the terms of our NDA. If providers did not establish an NDA in a previous round, they were given the opportunity to do so in this round. In other instances, NDA's were individually negotiated to address specific provider concerns.

When an NDA was established with a provider, the date that the NDA was established was recorded in Salesforce. A field in Salesforce was also populated as to whether or not the provider would be submitting new data for this Cycle 7 submission. If a provider responded with no change to the data, PCI removed priority from that provider and refocused attention on those providers who reported that there was a change to their data up to December 31, 2012. PCI wanted to establish the NDAs by focusing on those providers with new data to submit.

UPDATES TO DATA

Of these 151 providers submitted as part of the data package in this round, edited data has been submitted for 63 of them. This data comes in the form of new infrastructure, speed changes, and corrections from PCI's previously submitted data. In this round, the Partnership for a Connected Illinois added 18 new carriers:

No.	Carrier Name
1	BLIP Networks
2	City of Princeton
3	City of Springfield/CWLP
4	Convergence Technologies Inc.
5	Cox Communications
6	DerbyNet
7	DJ K Link
8	DLS Internet Services
9	EOS Inc.

10	Everywhere Wireless
11	Illinois Network Alliance
12	LiteWire Internet Services Inc.
13	Logonix
14	Nova Cablevision
15	Peoples State Bank
16	Rochelle Municipal Utilities
17	Urban Communications Inc.
18	Wonderwave

Broadband service providers submitted coverage in terms of the areas that they served, either in edited GeoPDFs, direct geospatial formats, CAD files, Excel databases, Google Earth files, or as paper maps. The submitted polygons were overlaid on the census block polygons and those blocks touching were selected and used. The proper speed tier categories were assigned as necessary.

Throughout February and early March, the PCI data team formatted data as it was received. A cutoff date of March 15, 2013 was established for the acquisition of new data to include in this submission. However, PCI continued to accept data well after that date, and all providers who submitted updated coverage in this round are included in this submission.

The table below summarizes the status of data among providers.

No update to coverage area/ verified previous data/previous data submitted	88
Previous provider provided an update to coverage area that was included in this cycle.	45
New provider for this round	18
Total number of providers included in this submission	**151**

Total number of providers included in this submission	151
Identified Illinois providers that have never participated in mapping project	34
Total number of providers identified in the State of Illinois	**185**

Changes and Corrections

On August 19, 2011, PCI along with the other SBDD's designated entities submitted a changes and corrections document to the NTIA for the data that was submitted in Round 3. PCI felt this was a very useful document, and would like to incorporate it into this narrative to demonstrate the extent to which PCI updated its data in this round. While the last section quantitatively expressed how data was changed, this section qualitatively explains each

of the updates that were made. Some of the more extensive changes and corrections will be described in later sections.

Provider	Change	Correction	Description
ATT	X		Added FTTH, Increase in 4G and 4G LTE coverage, and provided a full dataset of DSL coverage.
BLIP Networks		X	New fixed wireless provider.
Broadband Heaven Inc.		X	Format issue, merged 4 records with the same speed and spectrum info together, no update in speed or coverage.
Cass Telephone Company/CassComm	X		Added FTTH in Ashland, Philadelphia, and east of Chandlerville areas.
CenturyLink	X		Slight increase in coverage area, provided full dataset with changes.
Charter	X		Little change, submitted updated road segments and census block shapefiles of their coverage.
City of Princeton		X	New Provider, commercial only fiber provider.
City of Springfield/CWLP		X	New FTTP provider (Commercial only).
Clearwire	X		Little change, submitted updated shapefile of their coverage.
Comcast	X		Little change, submitted updated road segments and census blocks of their coverage area.
Computer Dynamics	X		Expanded coverage by adding 4 new towers.
Convergence Technologies, Inc.		X	New fixed wireless provider.
Cox Communications		X	New provider offering fixed wireless and cable (TT41).
CyberBroadcasting	X		Added infrastructure and increased speeds.
Delta Comm/Clearwave	X		Added two central offices.
DerbyNet		X	New provider. Towers, speeds, and frequency info were collected from the website and a RF Propagation was ran assuming 100ft, customer radio at 20 feet above ground and the band used was the 5.7 GHz band for all sites.
DJ K Link		X	New fixed wireless and FTTH provider.
DLS Internet Services		X	New provider.
EOS.Inc		X	New provider.
Everywhere Wireless		X	New provider.
Fairport	X		Increased speeds, fresh set of addresses.

Frontier	X	X	Corrected company names to correct, TransTech 20 was corrected to TransTech 10, Frontier is rolling out bonded ADSL 2 and VDSL in some offices.
Harrisonville Telephone Company	X		Increase of a DSL speed near Dupo, IL from new remote terminal near Dupo, IL.
Home Telephone		X	Corrected Upload Speeds
Illinois Consolidated	X	X	Increased speeds in Blue Mound, deleted all TT30 as Consolidated does not have, corrected the FTTH.
Illinois Network Alliance		X	New Middle Mile provider.
Illinois Rural Electric Coop	X		Expanded bandwidth and Added 2 towers.
Joink	X		Added towers and increased speeds.
La Harp	X		Fiber project complete.
Leap Wireless	X		Leap provided a shapefile of their coverage. Slight expansion of coverage in the St. Louis area.
Level 3	X	X	Updated Middle Mile, provided an updated address list, PCI has selected the census blocks associated with the addresses.
LiteWire Internet Services, Inc.		X	New fixed wireless provider, data was given to us from CostQuest Associates and the Wisconsin SBI.
Logonix		X	New fixed wireless provider.
Madison Communications Company, Inc.	X		Upgraded cable to Docsis 3.0
Mediacom	X	X	Updated all Illinois coverage to TT40 (Docsis 3.0), went county by county looking at geocoded addresses, city limits, and census blocks to fill in holes in coverage.
MegaPath	X		Updated road segments, Middle Mile, and census blocks of their coverage.
Metro Service Center	X		Installed new Wi-Max tower.
Mid Century	X		Increased DSL speeds, removed DSL in Yates city & replaced it with FTTH.
Mount Vernon Net	X		Increased speeds, took two towers off line.
Network Business Systems	X		Acquired D-Max.Inc(Maxiss), increased speed in D-Max.Inc territory.
Nova Cablevision		X	New provider.
Now Wireless	X		Upgraded speeds, no change to FTTH.
Park TV and Electronics	X		Added 8 new fixed wireless towers, added FTTP census blocks that are for commercial use only.
Peoples State Bank		X	New fixed wireless provider.

RCN	X		RCN provided an updated address list, PCI has selected the census blocks associated with the addresses, added almost 800 more census blocks. Updated Middle Mile as well.
Rochelle Municipal Utilities		X	New fixed wireless provider.
Royell	X		Upgraded infrastructure to increase speeds.
Rural Enterprises.Inc (Rural Comm)	X		Expanded coverage in Cumberland county.
Sidera	X		Added more Middle Mile data.
Sprint	X		Expanded 4G coverage in Chicago region.
T6	X		Acquired Barbeck Communications, IL portion of Prairie iNet, and Comlec Services Inc., Stateline ISP.
Telecommunications Management, LLC/NewWave	X		Acquired Cequel III Communications II, LLC, upgraded most of Cequel's coverage to 15mbps down 1.5mbps up.
Time Warner Cable Inc.	X		Little change, submitted updated road segments and census blocks shapefile. Updated FRN number.
T-Mobile	X		Increased 4G (HSPA+42) and Middle Mile.
Tonica Telephone Company	X		Speed increase, no footprint change.
TW Telecom	X		Updated Middle Mile, provided an updated address list, PCI has selected the census blocks associated with the addresses.
Urban Communications, Inc.		X	New provider, added Middle Mile data, added fixed wireless data.
US Cellular	X		Expanded 4G LTE coverage.
US Signal Company	X		One new Middle Mile point.
Verizon	X		Increased 4G LTE coverage.
Wisper ISP	X		Upgraded infrastructure to increase speeds, added 1 tower.
Wonderwave		X	New fixed wireless provider with Middle Mile data.
Zayo		X	Added census blocks as part of their submission. This is a commercial provider only.

SBDD DATA TRANSFER MODEL METHODOLOGY

The submission of the broadband dataset for April 1, 2013 is contained within the SBDD Data Transfer Model. PCI has reviewed all literature that relates to the release and use of this data transfer model and recognizes that it does not replace or dictate how data is stored, processed, or displayed for the State, as it is meant primarily as a means to transfer the broadband data from all states and territories and populate the National Broadband Map in a seamless fashion.

In addition to the narratives and methodologies contained herein, as well as the DataPackage.xls containing contact information, the data dictionary, and a provider summary table, the following feature classes are submitted within the SBDD Data Transfer Model for the state of Illinois.

Inventory of Deliverables, Partnership for a Connected Illinois: April 1, 2013:

NOFA Requirement	Data Transfer Model	Data Description
AppendixA: 1(a)	BB_Service_Address	List of addresses at which broadband service is available to end users in the provider's service area.
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in Census blocks of No Greater Than Two Square Miles in Area
Appendix A: 1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census blocks Larger in Area Than Two Square Miles
Appendix A: 1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address
Appendix A: 3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points
Appendix A: 4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing

The provider data collected by PCI on behalf of the State of Illinois have been formatted per the given specifications and uploaded into the appropriate feature classes of the SBDD Data Transfer Model. Wireline availability is contained within census blocks and road segments. Wireless availability is contained as polygons of coverage areas. Middle-mile connections and community anchor institutions are contained as point data. The subscriber weighted nominal speed (if available) is contained within the overview feature class. All speed data is contained at the census block, road segment, or wireless polygon level of availability. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information as possible.

In this round, we are again including the state boundary. Commenting on previous round of data submission, NTIA cited issues with data gaps near the borders of the state and recommended using the U.S. Census Bureau state boundary data. Thus, in this round of data submission, we are including the U.S. Census Bureau 2010 Census Illinois state boundary in GCS_WGS_1984 coordinate system.

DATA PRODUCTION METHODS

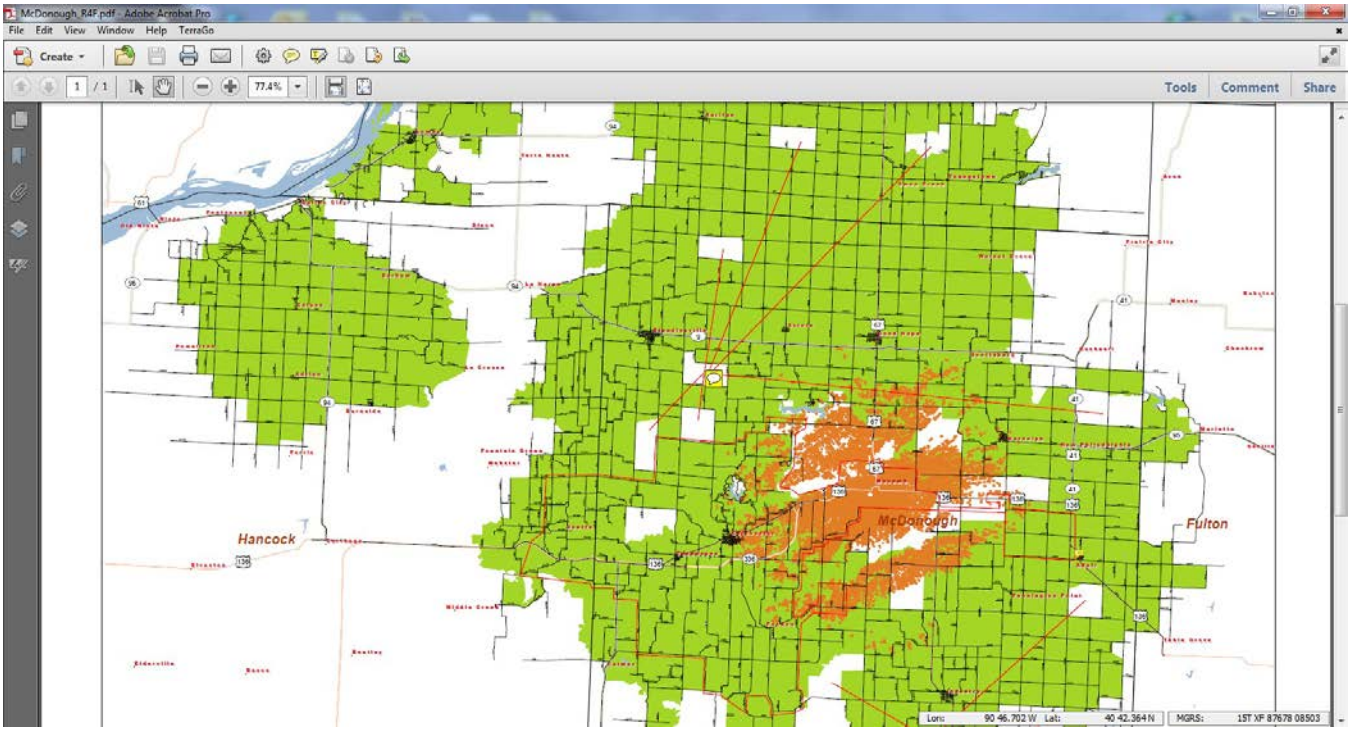
As mentioned, data was received in a number of formats that required processing in order to prepare the data for submission in accordance with NTIA requirements. This section discusses how PCI processed provider data, as well as how PCI assisted the provider in making the update process as easy as possible. It examines each layer and the steps PCI took in making the updates.

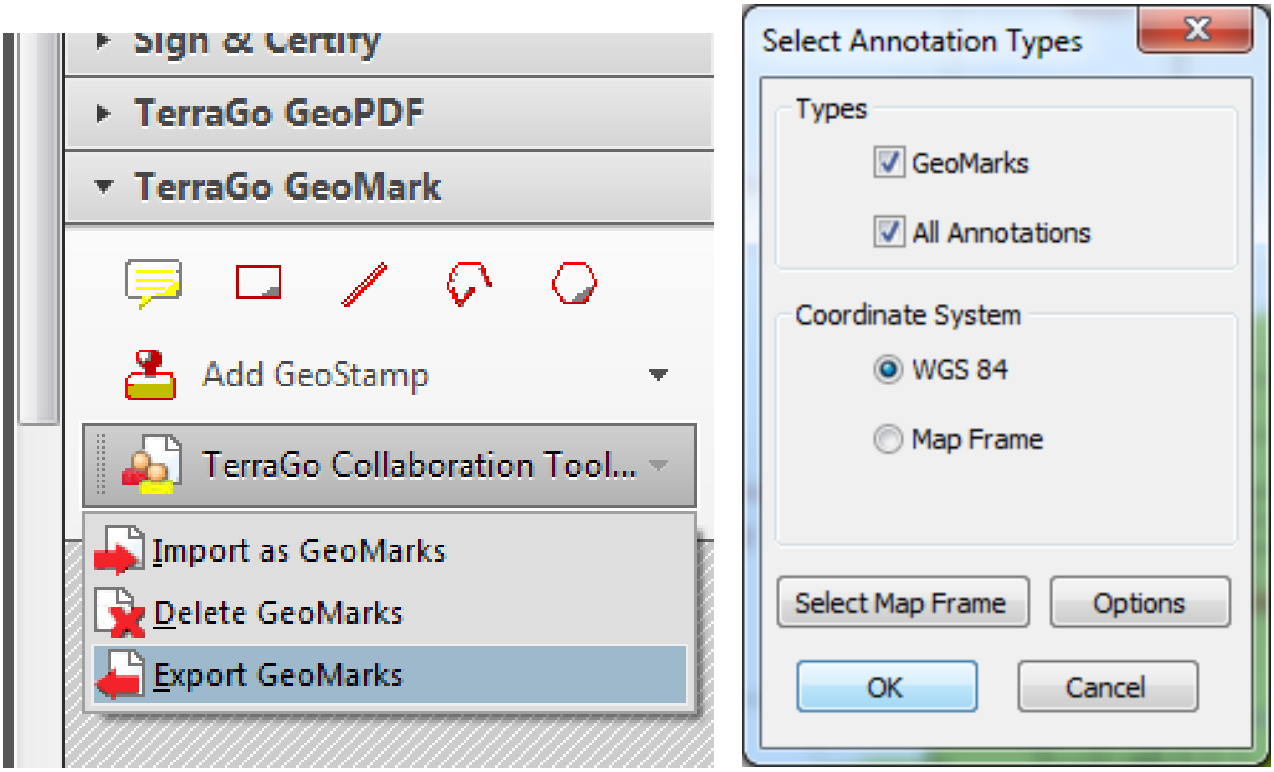
GEOPDF AND TERRAGO TECHNOLOGIES TOOLBAR (DSL & FTTH)

In the initial outreach made to the providers from January 15 - through January 25, 2013, they received a map of their existing coverage area. These maps are in the TerraGo Technologies GeoPDF format. This allows the provider to mark up the map with corrections and allows PCI to bring those corrections into ArcGIS. Instructions on how to install and use TerraGo GeoPDF were made available here: http://broadbandillinois.org/maps/Carrier-Maps/About-GeoPDF-Maps.html .

This toolbar created several opportunities for the provider to really zoom in and edit their coverage area. When it comes to verifying carrier level data, PCI felt the GeoPDF and the virtual meetings where PCI and the provider started carving up the data were extremely useful. The images on the next several pages demonstrate how DSL and FTTH providers were able to use the toolbar to carve up coverage areas to update their data.

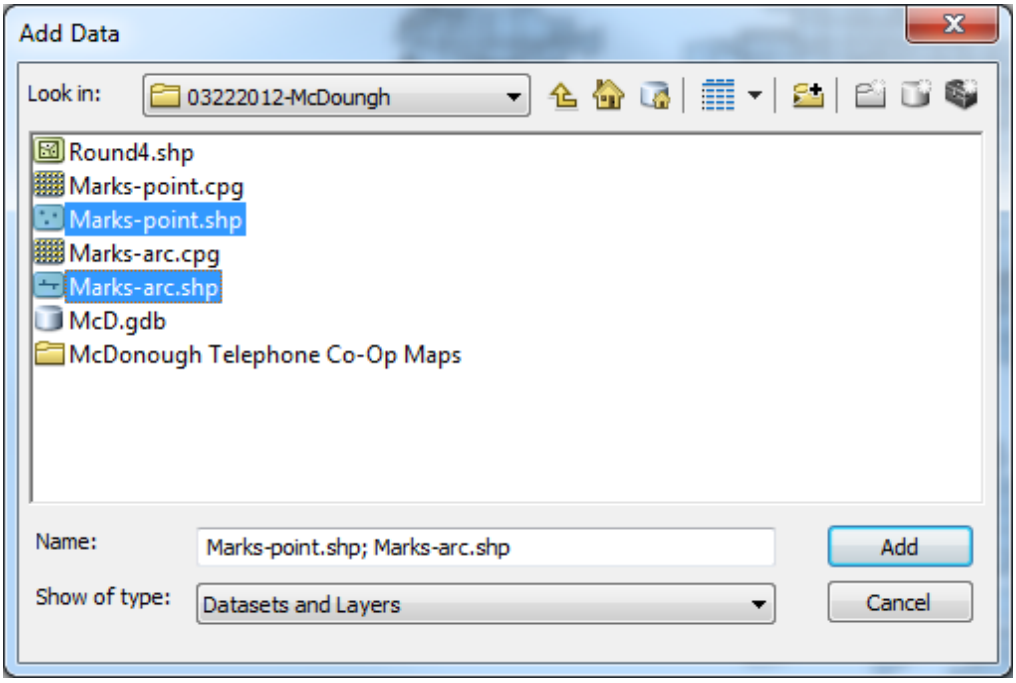
The provider, upon opening the map was instructed to use the  icon to turn layers on and off, and follow the instructions to mark up the map. The image below is a marked up GeoPDF of McDonough Telephone Cooperative in which they indicate where they have had FTTH deployment since their previous submission.

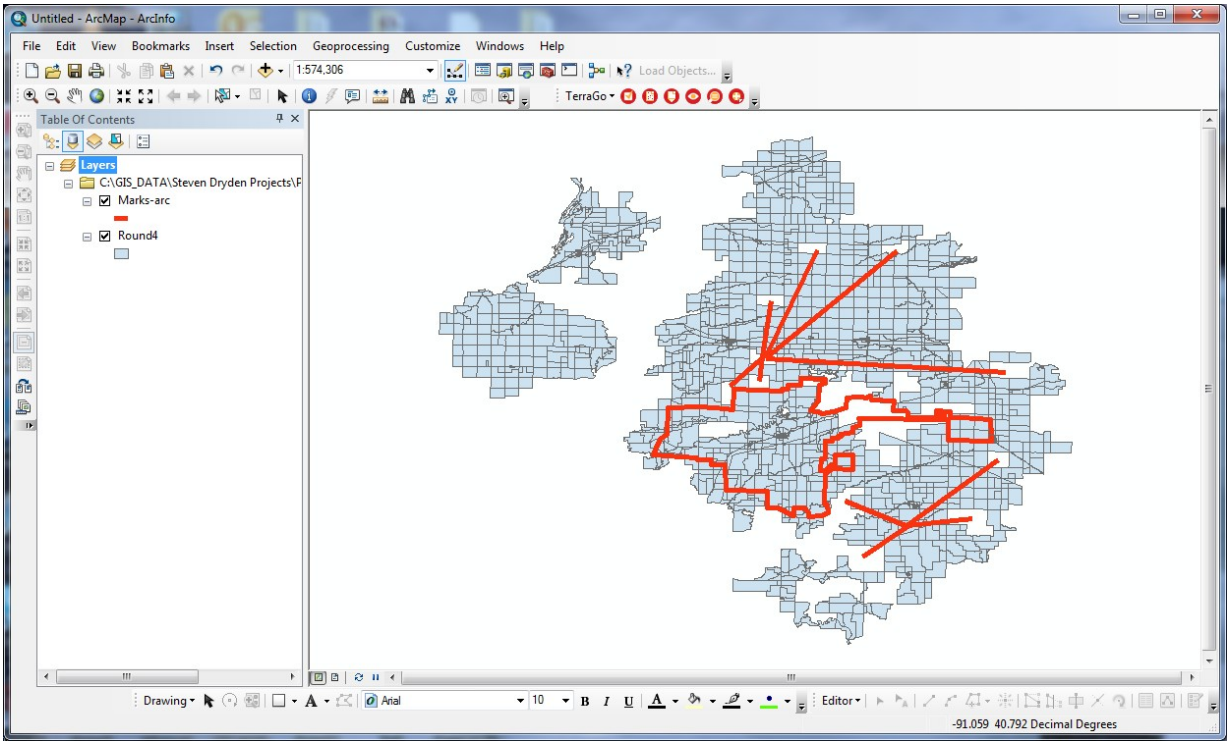




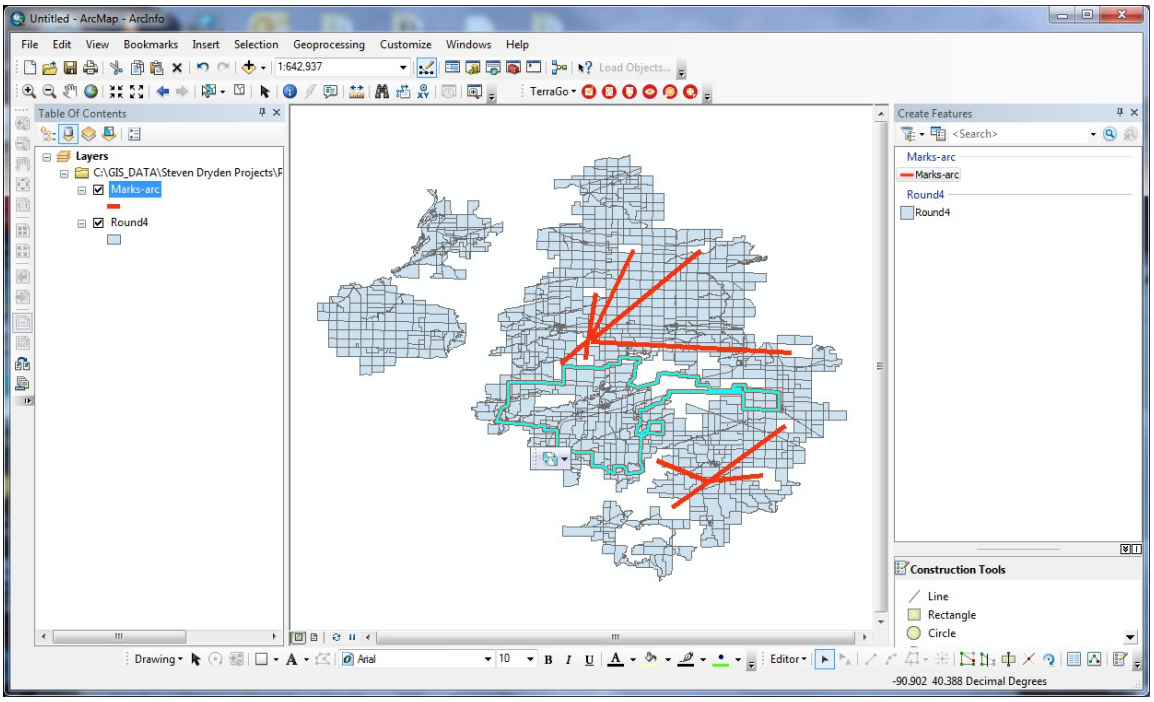
With this tool, providers can draw lines, comments, polygons, and points as indicated in the image to the top-left. From here we can export comments and geomarks as an ESRI Shapefile as demonstrated by the images above.

After exporting the geomarks from the GeoPDF, we can now import them into ArcGIS. This provider has drawn lines to show where they have added FTTH and where they want us to fill in holes in their other census block coverage. The geomarks are indicated by the red lines on the bottom image.

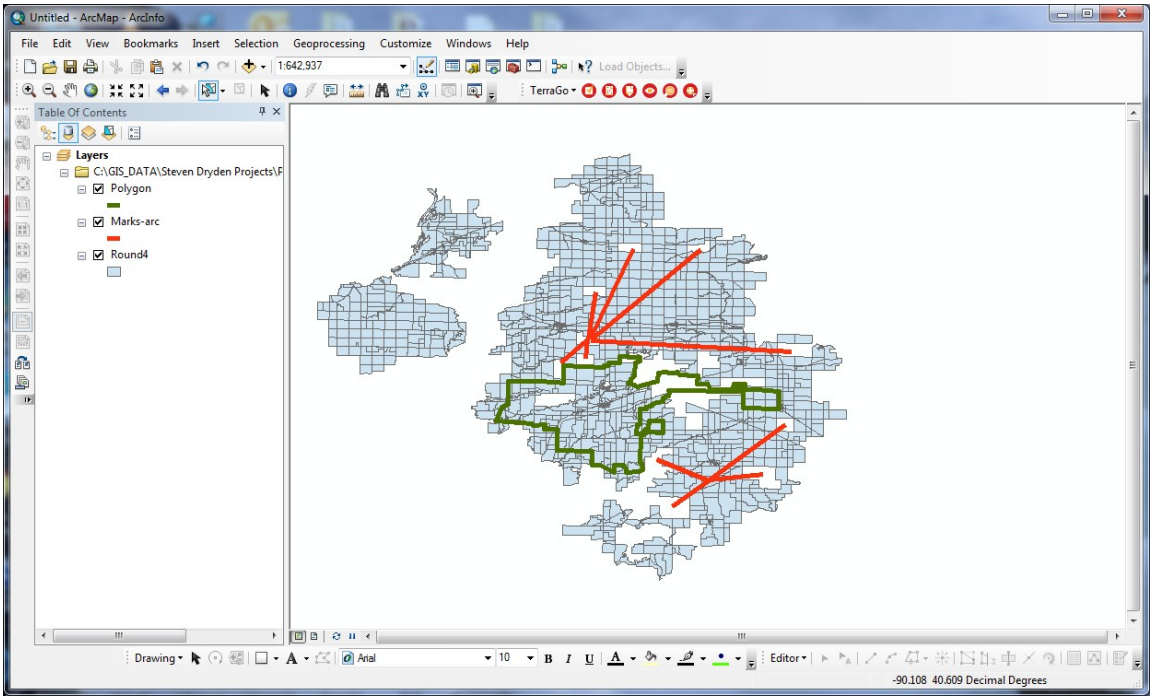




From here, we add Census Blocks as needed. For lines that represent an area, we can convert to a polygon so we can easily select Census Blocks. First we select the lines that need to be converted into a polygon (highlighted in Blue), we will export the selected.

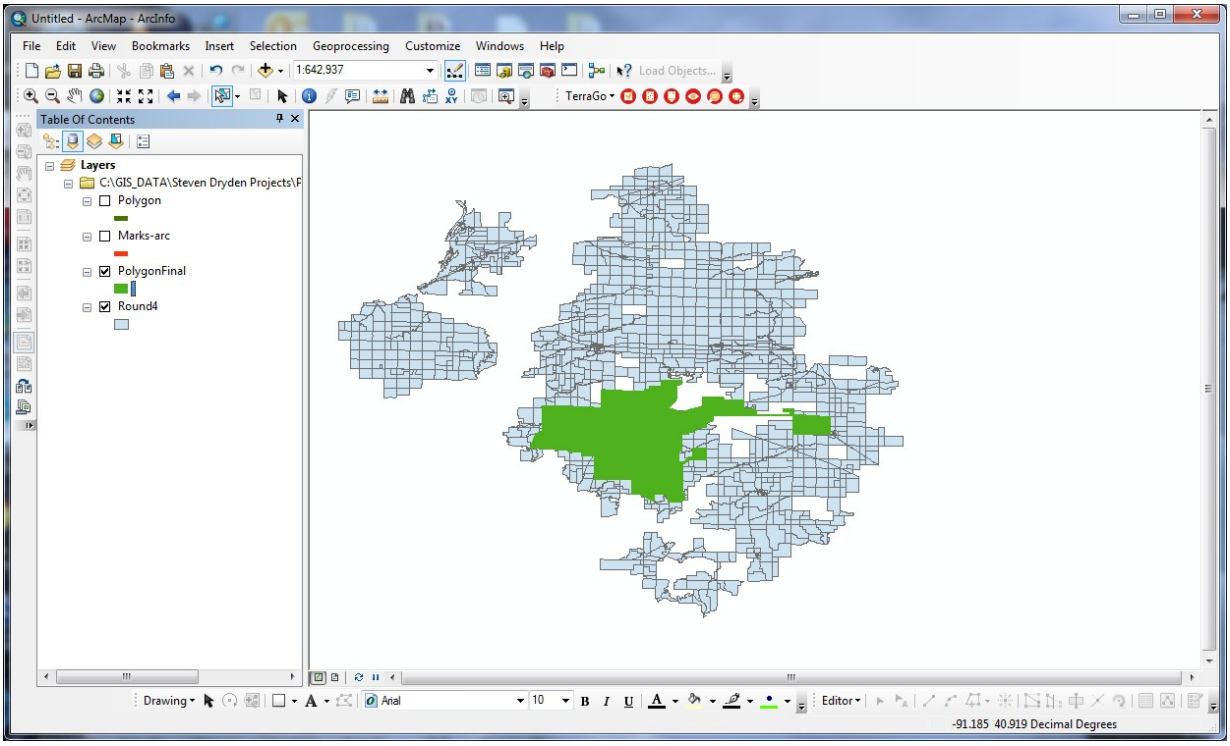


Here you can see we now have separated the polygon line we need. Now we can convert this to a true polygon.

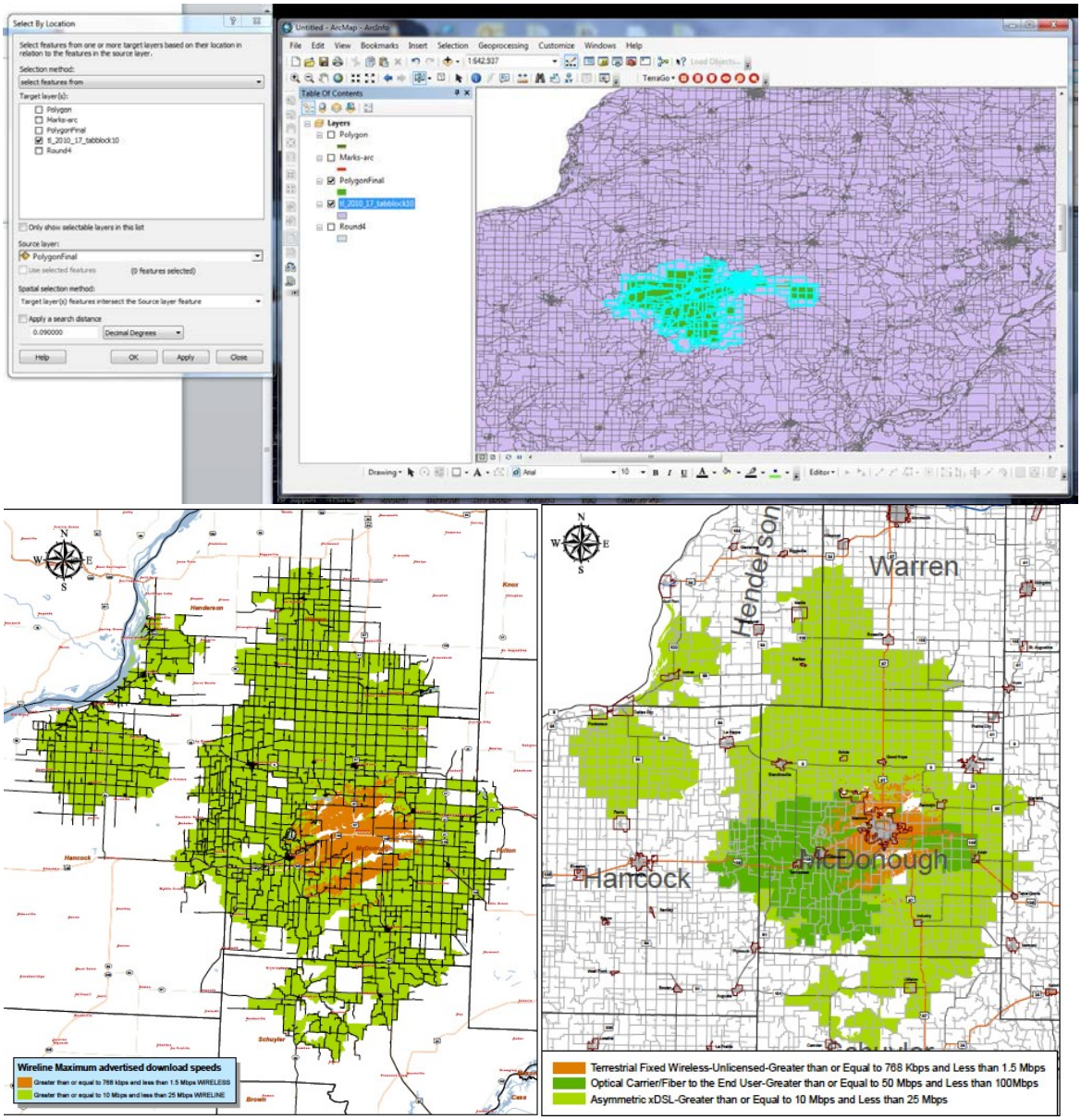


To convert a line to a Polygon, we used the Feature To Polygon tool in ArcGIS

The end result is a polygon that will be used to select census blocks that are inside or touch the boundary of the polygon.

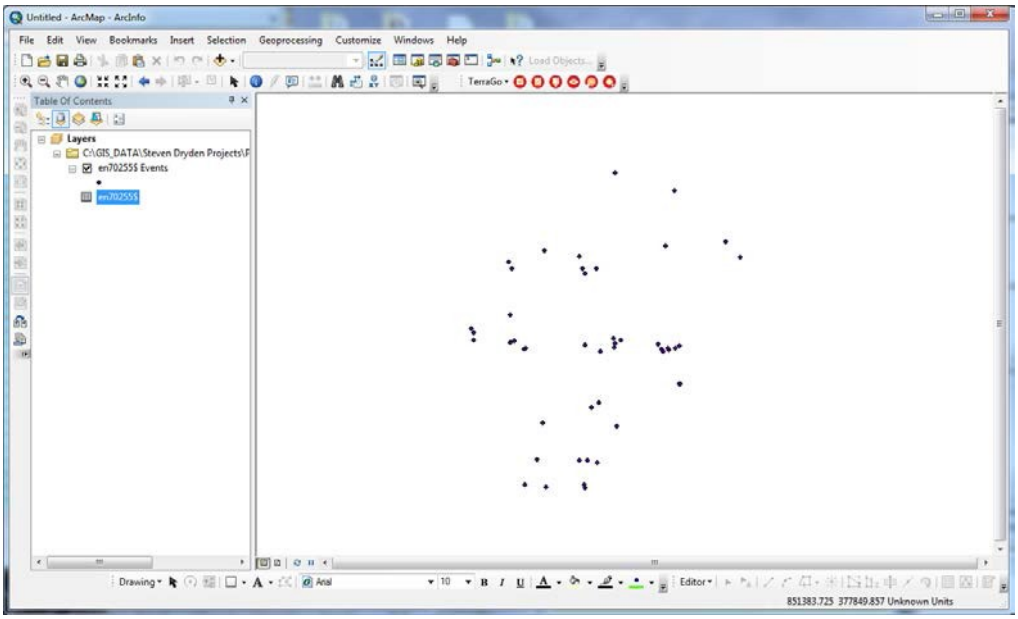


To obtain the Census Blocks needed, we used Select By Location process. As you can see, the census blocks are now selected. All that is needed now is to export the specified census blocks out, and provide the data with attributes as indicated by the provider. The maps below show the initial data and the data after the updates are made through the GeoPDF software.

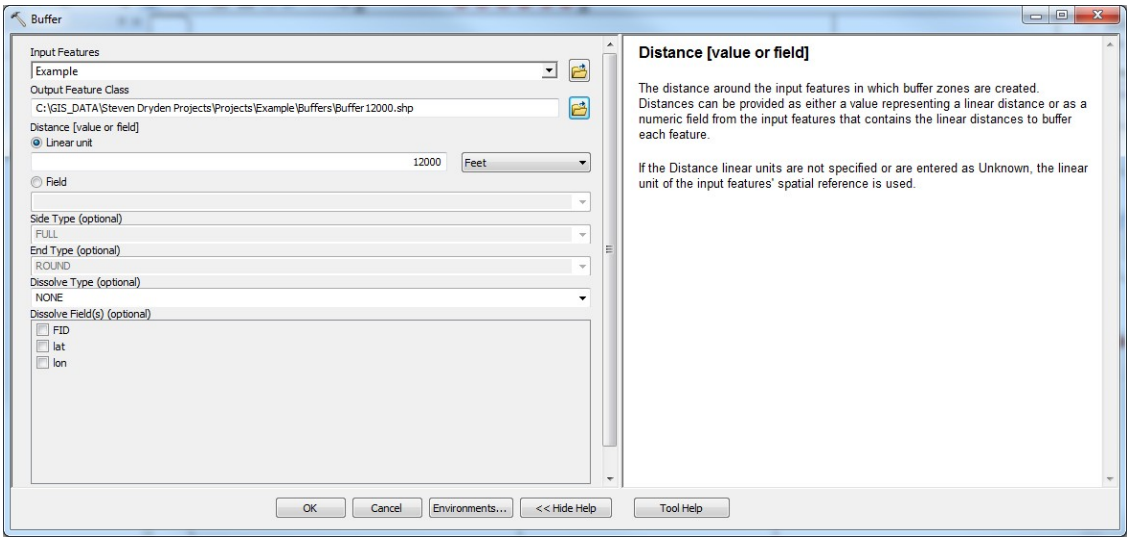


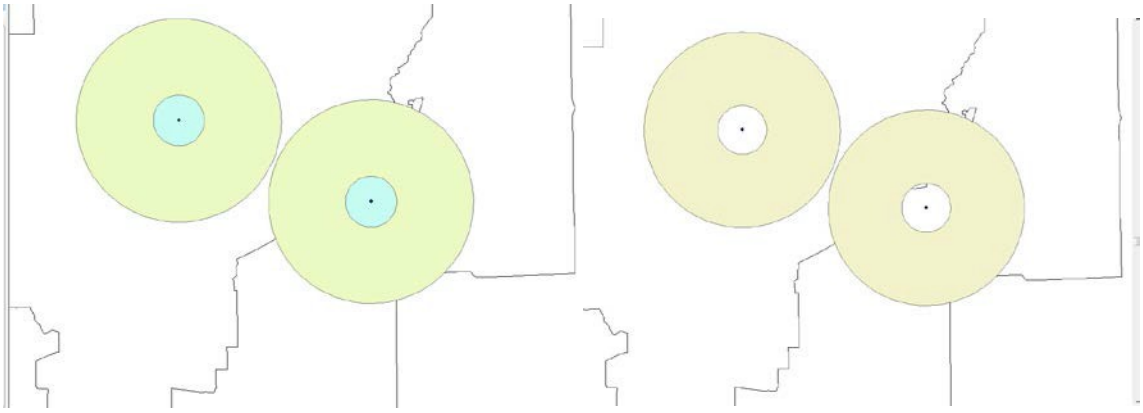
WIRE CENTER BOUNDARY CLIPPING

Some DSL providers sent an Excel table that displays latitude and longitude for central office and remote terminal locations. This creates a special challenge for us because DSL service extends 12,000 feet from the center, but is not allowed to cross the wire center boundaries. Also, we must factor in that at 3000 feet from the wire center, speed decreases from speed tier 5 to speed tier 4. First, we load the Excel table into ESRI ArcGIS. In ArcGIS, we can use latitude and longitude information to display data on a map using the Display XY Data function. We use this here to get a working shapefile.



With a working shapefile, we next buffer around each point for speed and coverage. We use two buffers of 3000ft and 12000ft.

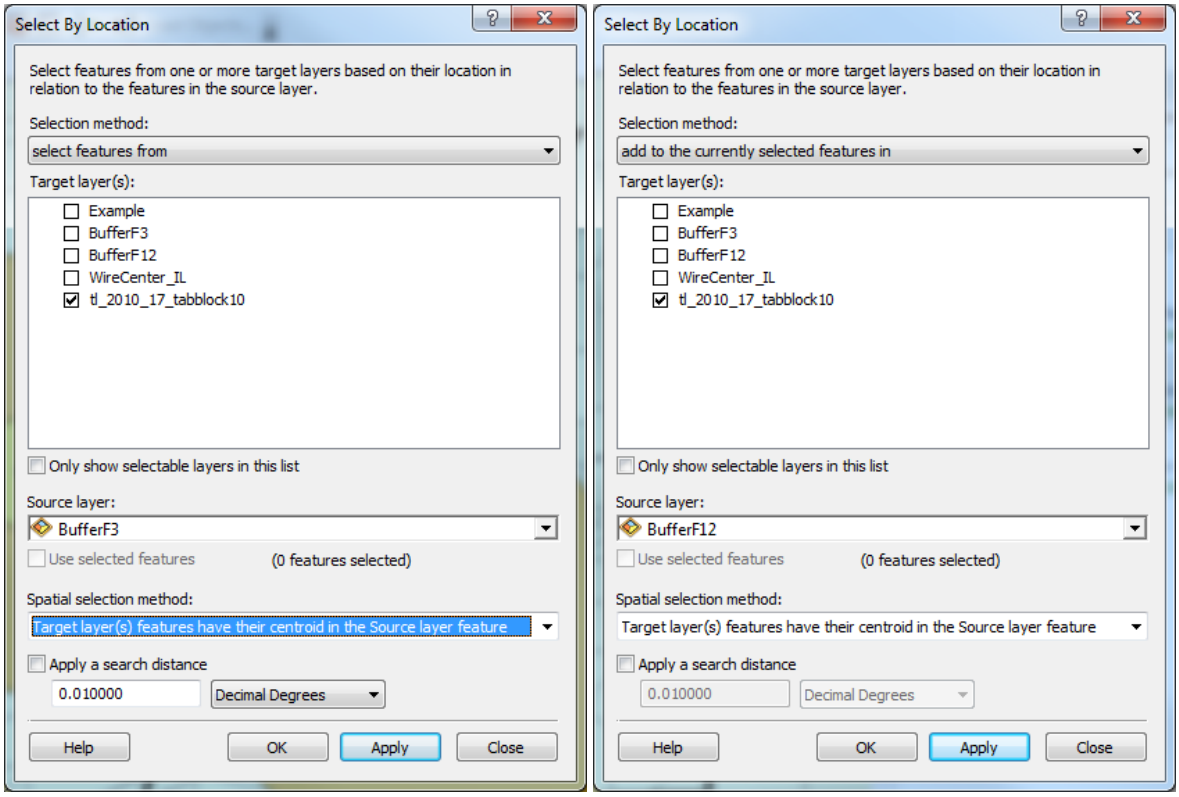


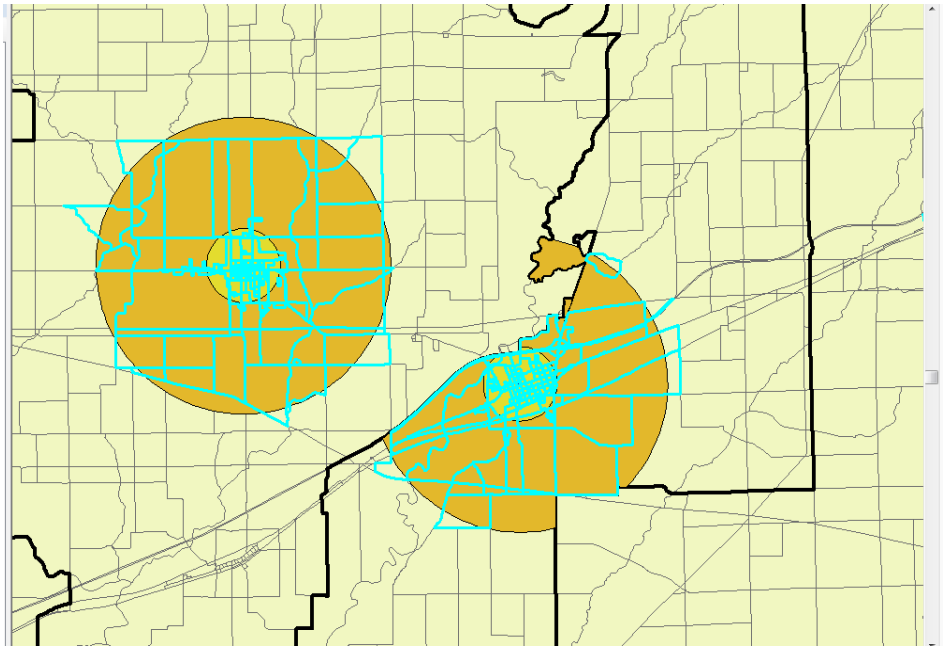


The resulting buffers are found in the above image to the left. We next clip the innermost 3000 feet from the 12,000 foot buffer. In the image on the right, we have turned off the 3000ft Buffer to show that there is nothing under them now. Coverage for wire centers can not cross wire center boundaries, so we now need to trim the buffers so that they remain inside the boundary where they are located. We next use the Intersect tool to break apart the coverages based on the wire center boundaries.

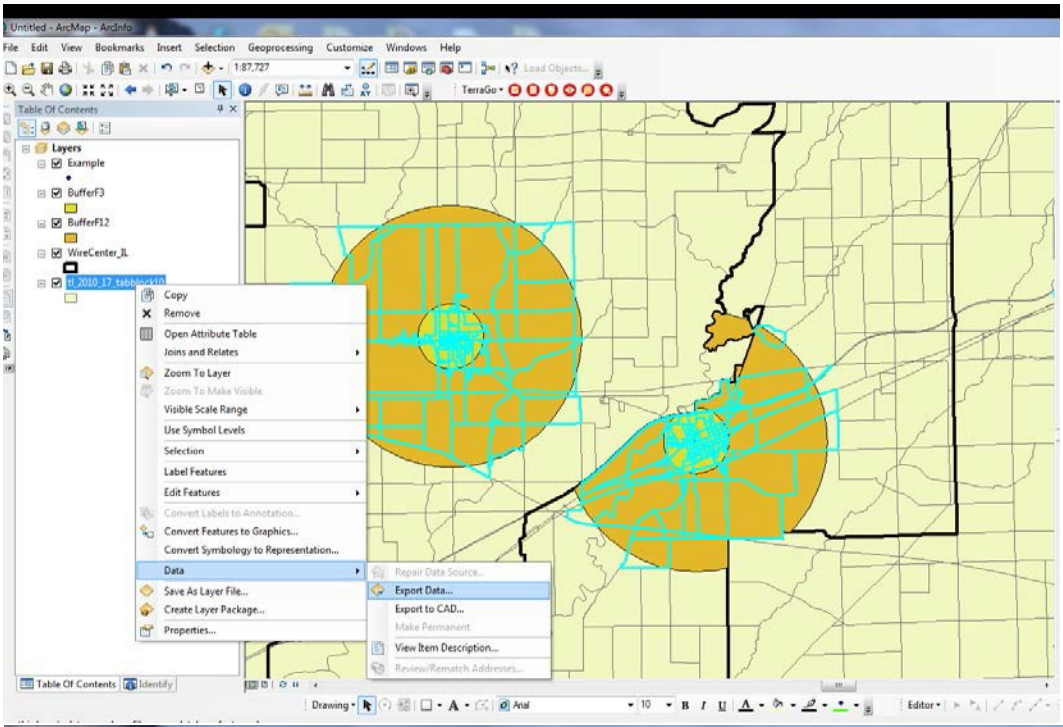
As you can see, the polygon is now broken apart by the wire center lines. From here, we next start an editing session and delete those areas that fall outside the wire centers boundary. Select the area outside the boundary and press "delete" to remove those census blocks.

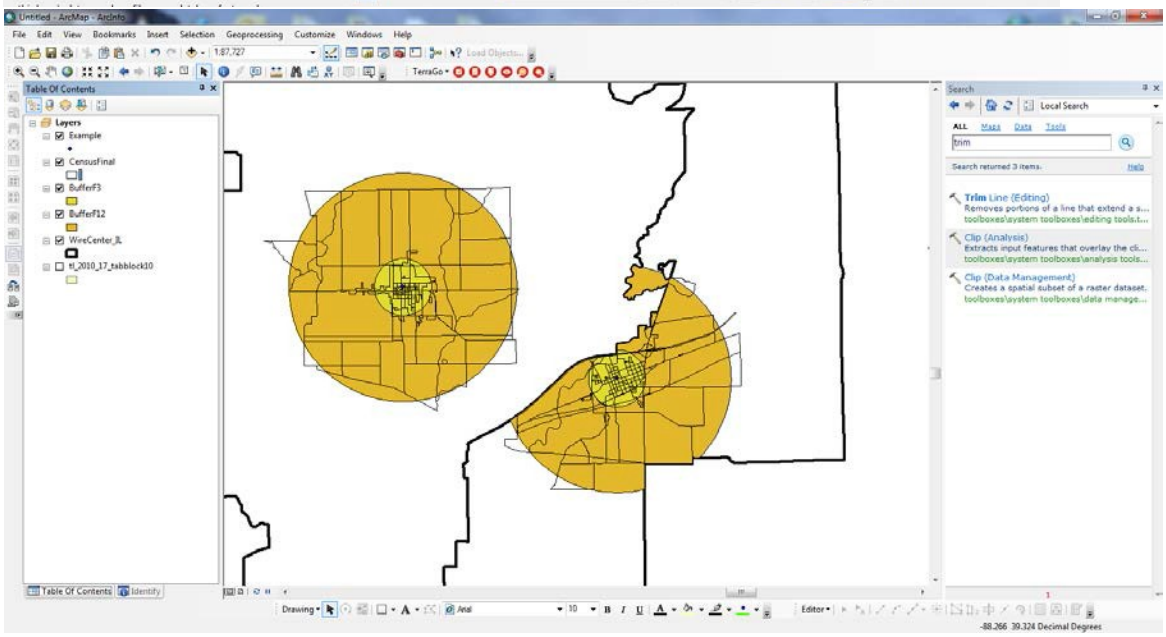
We do this for all wire centers, and then save our edits. After we are through with this, we next use these buffers to select census blocks by location. In this case we specify that a census block centroid be within either the 3000ft buffer or the 12000ft buffer in order to count.





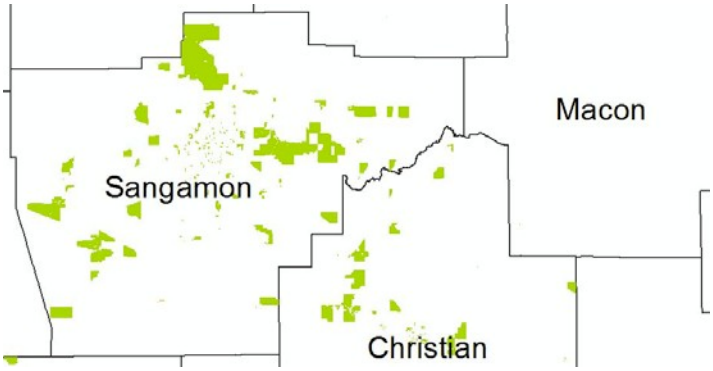
At this point we are ready to export the selected Census blocks, and assign speeds based on which buffer the census blocks fall within.

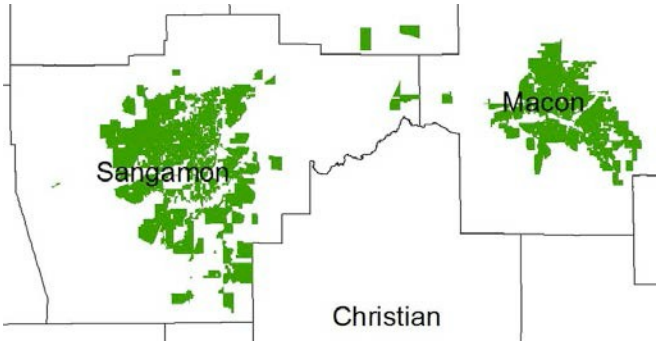




After we provide the census blocks with attribute information, we next send a GeoPDF to the carrier for approval, and then load it into the master geodatabase.

CABLE COVERAGE





Some cable carriers submitted their service area coverage data in the form of a spreadsheet citing customer addresses. These addresses were converted to a point layer via a geocoding process. These points were then superimposed on top of a 2010 census block layer, and all of the census blocks that had one or more address-derived points associated with them were selected. The selected blocks were then converted into a polygon layer which was attributed with appropriate broadband provider information such as provider name, technology of transmission, maximum advertised downstream speed and so on. A portion of the Mediacom map above indicates an example of this in the above map.

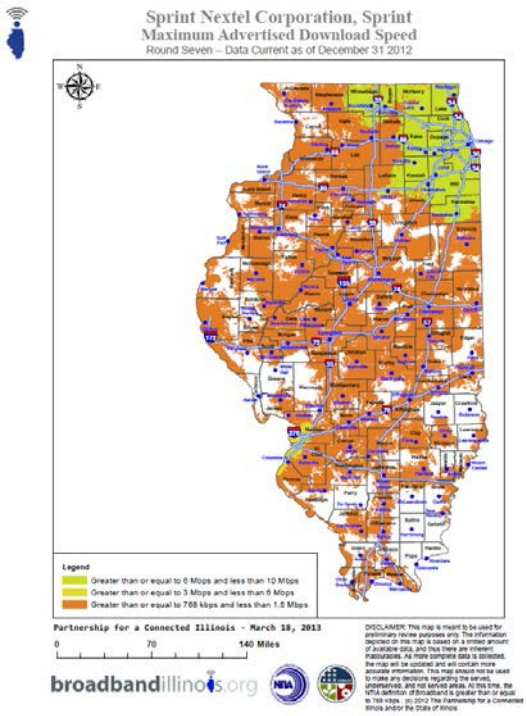
Other cable carriers including Comcast submitted a series of spreadsheet records which were matched with the corresponding Illinois 2010 census blocks polygon layer. The matching polygons were then superimposed on the Census CBSA layer which was joined with the provided maximum advertised (MAXAD) speeds spreadsheet. This way each individual census block was attributed with the corresponding MAXADDOWN and MAXADUP value.

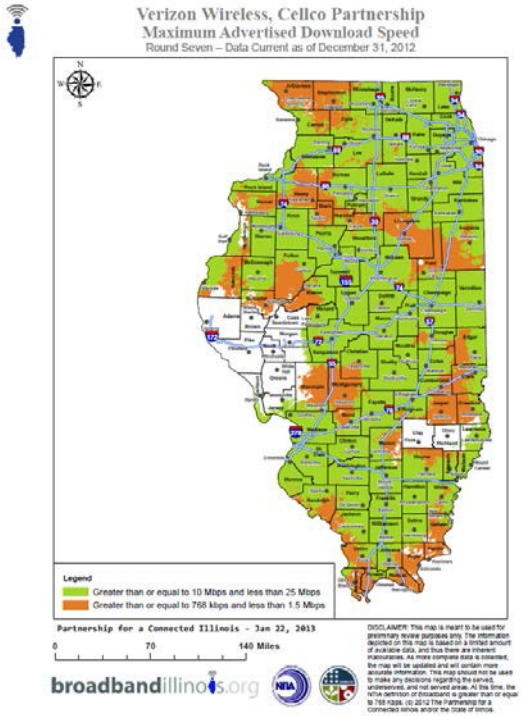
Street segment spreadsheet data records were geocoded based on mid-point value of the reported street segment address range. A point layer thus derived was next overlaid with the 2010 census street layer. Census street layer segments that were associated with the geocoded points were then examined, one-at-a-time, to make sure that they matched the reported street, city and census block information. Some of the reported records had to be discarded as they could not be located via the above process.

A GeoPDF map depicting both, census block and road segment data, was reviewed by Comcast and a number of census block records were deleted as a result of Comcast feedback.

MOBILE WIRELESS COVERAGE

PCI has collected mobile wireless coverage from most providers in the State. These shapefiles were imported into the database and assigned attributes. An example of this data is below.

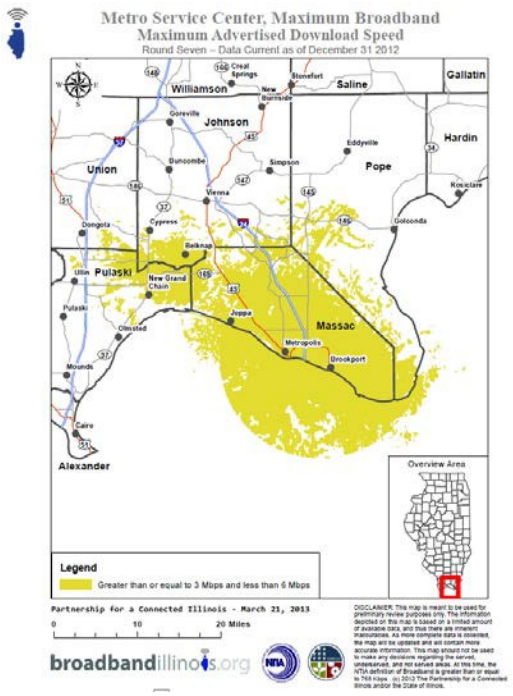


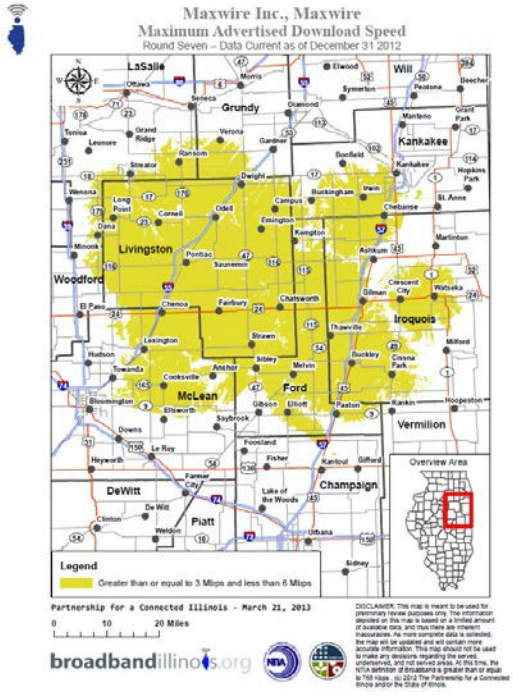


WIRELESS METHODOLOGY

Once again, almost every fixed wireless provider allowed us to use their tower locations, antenna heights, equipment selection and direction/spread of coverage to derive coverage areas. With the provided tower information, professionally prepared radio frequency coverage studies were conducted and converted to shape file format. These studies have proven to be very accurate and represent service areas where the maximum advertised speeds can be delivered. These studies take into account full consideration for terrain and tree clutter data. For any carriers who could not provide their own RF propagation coverage polygon, RF propagation studies were done in house. The Longley-Rice propagation model was used. Studies were conducted using 10 meter resolution terrain data. Tree and vegetation clutter data resolution is 30 meters. All propagation results had a minimum of a 10 dB signal fade margin built into the results in addition to losses calculated for clutter. Signal level minimum thresholds were set on the study maps to a level that each carrier deems reliable and serviceable at those speed tiers, not just the minimum to establish a connection. These maps are not based on the manufacturers best case scenario radio capabilities in a lab environment. These coverage polygons represent what can be delivered in the face of interference in the shared spectrum used for those with transtech codes of 70 and spectrum code 6.

There appears to be some variation on how the NOFA coverage definition is met. In other words, there seems to be a disparity on the necessary strength (e.g. -80 dB, -98 dB, -120 dB, etc.) to provide the appropriate quality of service for data services and still be able to deliver the maximum advertised speeds. While we took these issues into account for our internally generated RF propagation studies, we do not have specific details for carrier provided polygons such as cellular mobile data and 4G service footprints.





SATELLITE

This round of data updates includes four broadband satellite service providers – ViaSat, HughesNet, Skycasters and StarBand. All of these providers communicated that their service area encompasses the full extent of the state of Illinois.

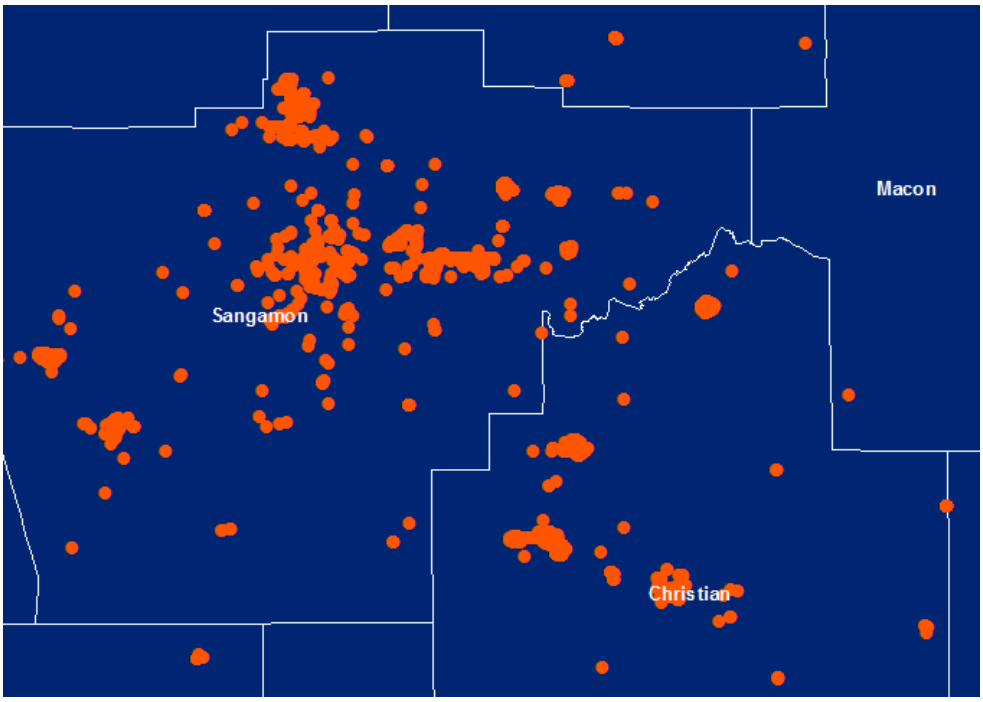
MIDDLE MILE

Middle-Mile (MM) data is acquired via either a direct carrier submission in the form of a spreadsheet or a text document citing specific MM hub coordinate pair values, or by obtaining the general MM hub location from the carrier's web site.

In the case where specific coordinate pair values are available, a point layer is generated using ArcGIS software. This process entails bringing tabular XY coordinate pair values into ArcGIS, and creating an "event theme". The "event theme" is then exported into a stand-alone point layer which is then attributed with the necessary information.

General, web-derived locations are converted to a point layer by citing towns where the MM hub presence is identified by the carrier. Town point locations are next attributed with relevant data.

ADDRESS LAYER DATA



Service address information in this round was provided by the same three carriers that provided it in the last round - Mediacom Illinois LLC, FairPoint Communications and RCN Telecom Services of Illinois, Inc. Mediacom and RCN reported new data in this round; FairPoint data did not change.

Supplied address data was geocoded. Great care was taken to successfully rematch addresses that were not matched during the initial geocoding run. Spelling errors were the most common reason an address failed to geocode correctly. Such errors were resolved via web or Google Earth searches. The resulting point layer was used to derive the missing LATITUDE and LONGITUDE coordinate pair values which were then added to the Service Address layer attribute table. The geocoded results were also used to generate data for the census block layer. Above map illustrates the service address layer.

METADATA

Metadata, which literally means data about data, represent PCI's attempt to document procedures, coding, and overall methodology used in managing broadband supply data. Both short and long terms goals of developing PCI's metadata are to improve communication on Geographic Information Systems (GIS) data management issues for both internal and external partners. PCI's metadata is organized and structured around Federal Geographic Data Committee (FGDC) standards associated with key information impacting the following issues:

- What GIS data layers are managed by an organization?
- How is data coded or classified in assisting outside partners or organization use of the GIS data developed?
- When was the data developed and how often is it updated?
- Who developed the data layers and who should be contacted if anyone has questions?

The net result of developing PCI's metadata connects to the idea of communication and standards. When applied correctly over time PCI's metadata will assist in educating other users on essential questions needed when applying GIS data. In addition, it will assist PCI internally as metadata will help the organization identify and document critical developing issues shaping data development. Any new employee or organization will be pointed to metadata files when asking questions relating to methodology, attribute codes, dates of data edits or updates, and follow-up contact information within PCI's data team.

DATA VERIFICATION

Verification has become an evolving and ongoing process at PCI. The continued evolution of the Broadband Illinois website, along with the use of the GeoPDF process has created a feedback loop between provider and consumer and PCI that allows PCI to verify the carrier level data that it submits semi-annually to the NTIA. PCI continues to cultivate eTeams throughout the state that are able to take county and provider level maps and visualize the data and begin indicating areas where the data may not be accurate. PCI has also published a Supply Side Inventory in which PCI developed a system to rank Illinois's counties by broadband connectivity and looked at two major sets of third-party data to verify the data it had collected. The following sections go in to greater detail on the verification process but the outline below shows the basis for the verification process:

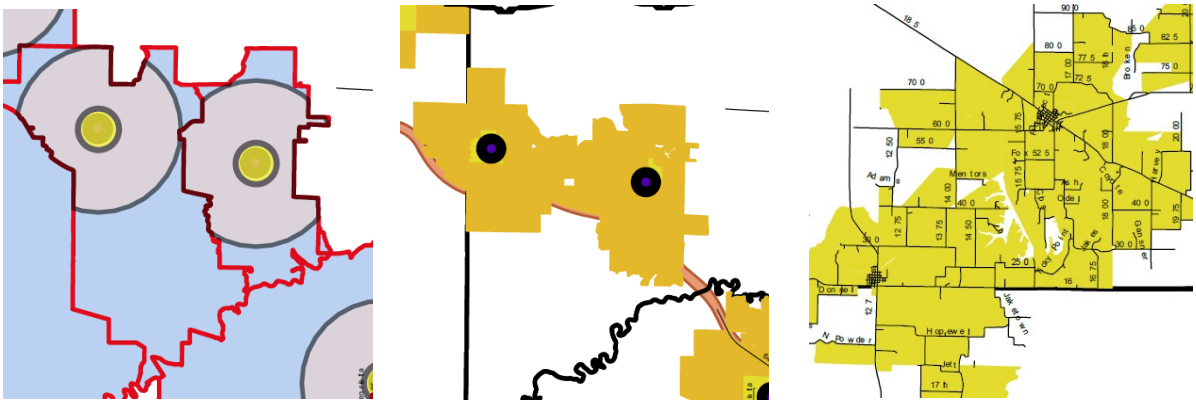
- Provider verification through extensive mapping GeoPDF process
- User verification through online web tools
- Trusted user verification through eTeam groups
- Third Party verification using third party data sets (ex. Gadberry, FCC Speed Test)

PROVIDER

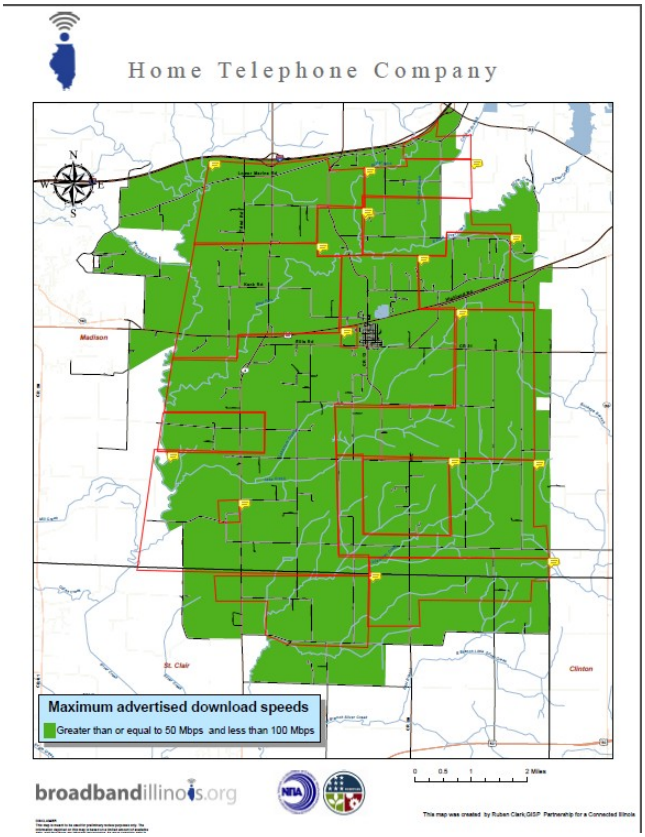
In this Round, PCI worked very closely with the provider sending back versions of the GeoPDF until the data was represented according to the provider. PCI considers this process to be the first of five forms of verification PCI has and will continue to carry out to ensure the data that is submitted to the National Broadband Map is as accurate as possible.

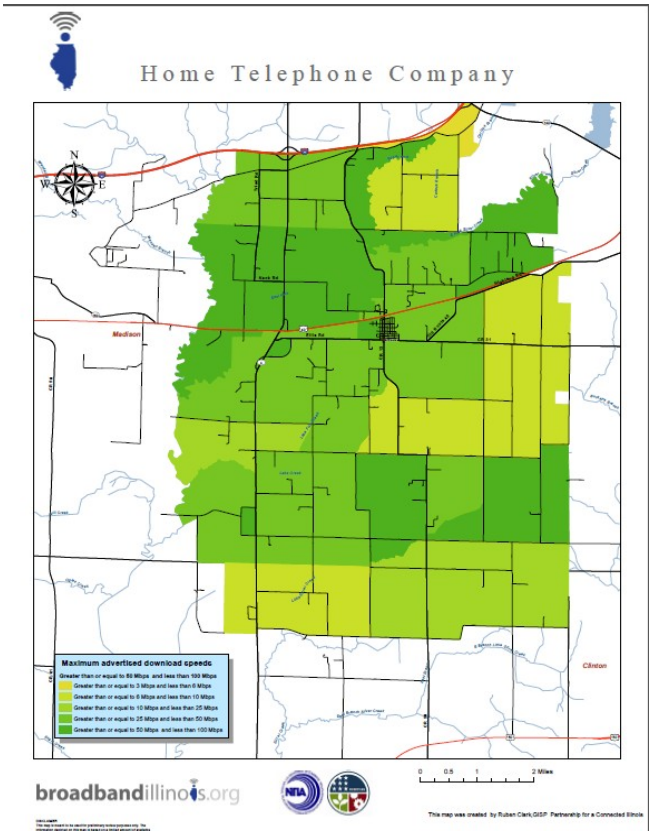
Previously, PCI purchased a set of wire center boundaries, which PCI used to map out DSL coverage for a couple of providers. Knowing that a DSL provider's Central Office or Remote Terminal that fell in a certain wire boundary could not extend service outside that boundary allowed PCI to map out these locations and create buffers around these locations based upon the speed. PCI recognized that locations 7500 feet from a DSL C.O. or R.T. would not receive the same speeds as locations only 1000 feet from that location. These buffers allowed PCI to make these changes. Due to confidentiality of these locations, maps that contain these locations with these buffers and boundaries are protected under the NDAs that have been established.

However, the images below provide an example of how PCI would use a C.O. or R.T. location to map out the coverage that a provider is able to provide in that wire center boundary. The image on the left shows two wire center boundaries that contain a C.O. The buffers are indicating that the areas closest to the C.O. receive speeds that are in Tier 5 while areas outside that initial ring receive download speeds in Tier 4. The second image shows how the data beneath these buffers looks when the wire boundaries and buffers are removed. The third image shows how the previous mapping contractor would have submitted this data in a previous round. As you can see, the same flat speed is dispersed across the entire region surrounding C.O. and R.T. locations. This is undoubtedly a form of verification.



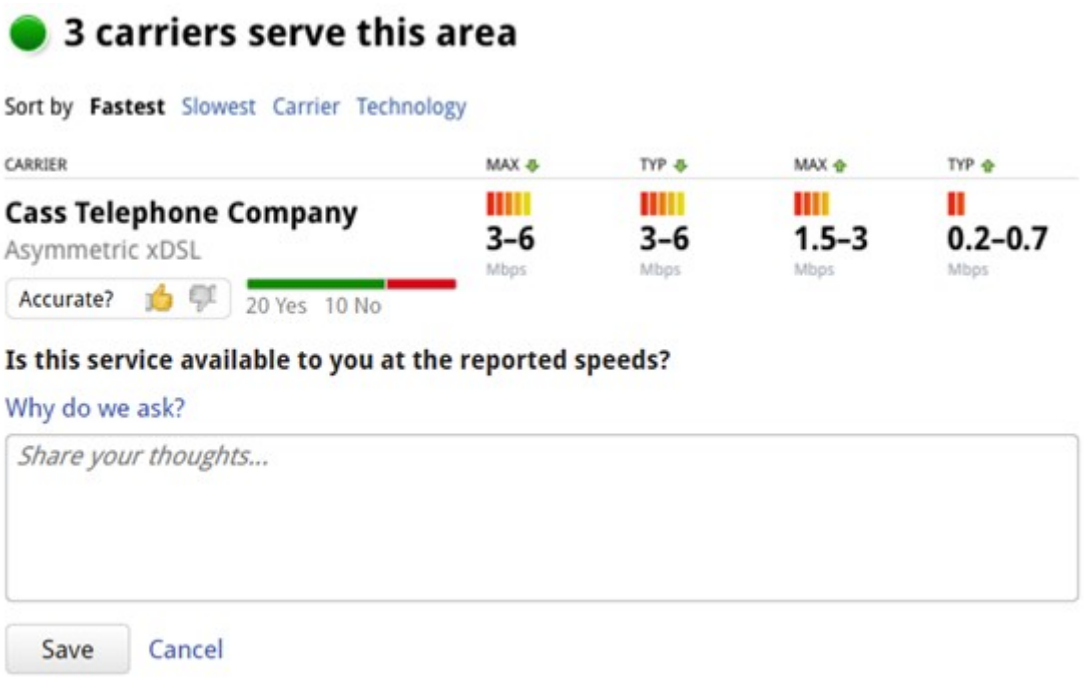
PCI has worked through this process for one of the two largest DSL providers in Illinois as well as a handful of small telephone companies throughout the State. In some instances, small telephone companies admittingly provided this data without sharing the locations and the GeoPDFs made this possible. The images of Home Telephone Company on the next page demonstrate how they used the TerraGo toolbar to reel back the previous data that was incorrectly submitted as DSL data with speeds across the region in Tier 9.





USER

PCI views the user as the second form of verification and has developed a tool to allow feedback on the data that is on the Illinois Broadband Map and in the semi-annual submission to the NTIA. When a consumer clicks on Broadband Illinois's search map they see the carriers that service that census block. The widget below allows the consumer to give PCI feedback on the providers that service that location.



TRUSTED USER

The third form of verification comes from the Trusted User. PCI has created GeoPDFs of all 102 of Illinois's counties that are available on the Broadband Illinois website. In this round, the Partnership for a Connected Illinois made great progress with its regional outreach strategy. PCI now has ten functional eTeam groups in ten regions throughout the State. The purpose of the groups are to aggregate demand for broadband, work with providers to fill gaps in access, find creative applications for the maps and data, and to educate consumers and businesses on the benefits of a high speed Internet connection. Over the last year, each regional eTeam has hosted at least one, in some cases as many as six regional meetings where area broadband providers and economic developers are invited to come and talk about using broadband as an economic development tool and work together on broadband related opportunities. While some eTeam groups are certainly further along than others, projects exist in each region to help utilize broadband to bring the region to the next level. Among these projects are working with providers on eRate in underserved regions, hosting an agriculture technology summit to talk to local farmers about the benefits of a broadband connection, and bringing together healthcare professionals to talk about needs with Health Information Exchanges.

Since the last round of data collection, the www.broadbandillinois.org has uploaded a multitude of new features and content with several other structural changes planned for this upcoming round. PCI has made available several of

the maps they have created through analysis of the data. Among these maps are broadband competition maps and regional, educational, and county ranking maps. Also at http://www.broadbandillinois.org/maps/Carrier-Maps.html, there are individual pages for each carrier in the State of Illinois. Contact information, mapping data, and any news stories that have been published about that provider are available on these pages. These provider pages are also geotagged so that they are available as providers are referenced throughout the rest of the website. As per the previous two rounds, geotagged county map pages also exist at http://www.broadbandillinois.org/maps/County-Data-Maps.html. The raw data that PCI provides to the NTIA semi-annually has also been made available.

The website also has an events section, where regional eTeam meetings, other broadband interest events, and computer training opportunities have been made available to website visitors. In this round, PCI has also developed a newsletter that serves as regular communication to upwards of 1,500 stakeholders in Illinois. These newsletters and other special interest news stories are available in the news section of the website. Finally, in the eTeams section, eTeam groups are able to have a repository for mapping data, events, and news most relevant to their region.

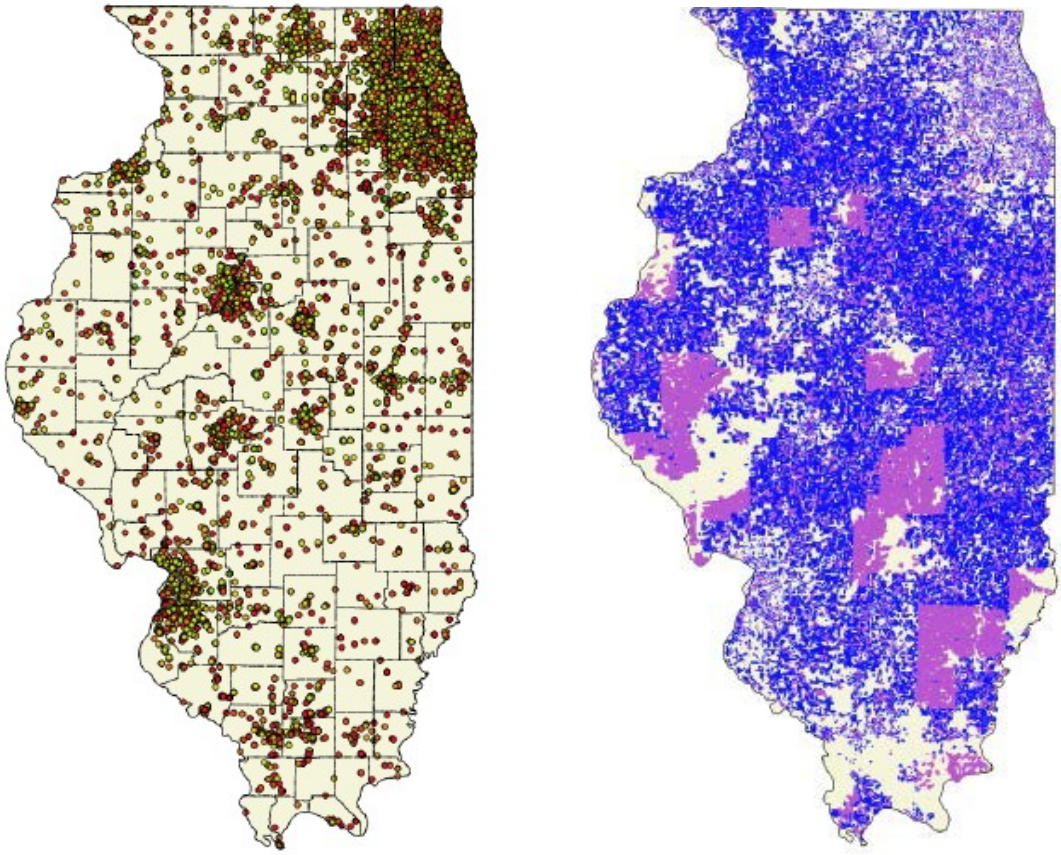
Third Party Data Sources

PCI published Supply Baseline Study, "Broadband Access in Illinois: A Baseline Snapshot", that summarized the state of broadband supply in Illinois. The report, a product of data analysis by the PCI data team, aims to quantify what is known about broadband data in Illinois and publish it along with an analysis of Third-Party data sources. An update of this report is under way.

The first method of third-party verification used in this examination was user speed test data through the broadbad.gov website. Through this website, the NTIA and the FCC solicited street address information with each speed test. They provided PCI with speed test data gathered over a 12 month period. This has been mapped and some limited studies have been conducted. These speed tests were accompanied by mini surveys which allowed for some analysis. The users were asked to input their street address and the type of internet connection they were using.

The second set of third-party data used for verification in this study was gathered by the Gadberry Company. The Gadberry data is a combination of various user/crowd sourced data sets. They indicate if there is broadband activity at the street address level and they then incorporate that information at the census block level. We have compared blocks showing coverage as stated by the carriers against the user reported information. There are some areas of the state where there are low or no user reported information.

The maps below show these third party data sources projected on a map of Illinois. The map on the left shows the location and results of the FCC speed tests, while the image on the right shows census blocks where the Gadberry dataset did not provide enough results for a significant analysis. On the Gadberry map, census blocks in blue indicate where there is a low sample rate, and census blocks in pink show where no samples were obtained. For more information on these third party data analyses, the Supply Side Baseline report is available on the following PCI website: http://www.broadbandillinois.org/Research/Infrastructure.html



ILLINOIS COMMUNITY ANCHOR INSTITUTIONS

PCI has established an ongoing procedure for gathering data on the physical location and broadband connectivity of Community Anchor Institutions (CAIs) in accordance with the data requirements of the SBDD NOFA Technical Appendix.

The table below summarizes the set of data that PCI is submitting in this round. Over the last three rounds of data submission, the total number of anchor institutions with connectivity data has continued to increase. The total number of anchor institutions stands at 12,338 – 45 records have been deleted since the last submission cycle as a thorough examination of the database netted a number of duplicate records. This culling out of records has improved the overall quality of the database.

	April 2012			Oct 2012			April 2013		
Cat	Total	Connected Points	% with connectivity	Total	Connected Points	% with connectivity	Total	Connected Points	% with connectivity data
1	5,331	3,278	61.49%	5,302	3,258	61.45%	5290	3254	61.51%
2	1,338	710	53.06%	1,321	703	53.22%	1262	742	58.8%
3	1,373	200	14.57%	1,336	191	14.30%	1338	192	14.35%
4	2,314	496	21.43%	2,302	492	21.37%	2392	580	24.25%
5	294	146	49.66%	285	143	50.18%	297	151	50.84%
6	1,527	1,526	99.93%	1,520	1,519	99.93%	1422	1420	99.86%
7	321	135	42.06%	317	134	42.27%	337	152	45.1%
Totals	12,498	6,491	51.94%	12,383	6,440	52.01%	12338	6491	52.61%

In Round 5, some of the most substantial increases have occurred within the healthcare, public safety, higher education, and other non-governmental categories. In Round 6, PCI focused on updating the library records in our CAI database. In this round, library Wi-Fi unknown connectivity category was reduced to zero. Public Wi-Fi and URL fields were updated through individually contacting each library. The following table summarizes vast improvements brought about by this effort:

Library Records Update Summary

	R6		R7	
Total Libraries	1321	100%	1262	100%
Public Wifi Yes	1053	79.7%	1115	88.35%
Public Wifi No	133	10.1%	147	11.65%
Public Wifi Unknown	135	10.2%	0	0%
Libraries with Websites	1050	79.5%	1122	88.91%

Additional improvements in this round include better connectivity data and further refinements in the schools dataset.

In the past, the non-governmental anchor institution category included only workforce development centers and other computer training centers. The anchor institutions that are now in category 7 include economic development centers, park districts, farm bureaus, and other community hubs.

PREVIOUS ROUNDS

Outreach in Round 1 focused on collecting the point and address data while subsequent submissions in Rounds 2 & 3 focused heavily on survey development, web site database research and teleconferences. Together with the Illinois Department of Commerce and Economic Opportunity (DCEO), PCI engaged in a process of working with CAIs on an organized basis. Other state agencies and organizations have included the Illinois Commerce Commission, Illinois Board of Education, and the Illinois State Police.

PCI created a survey using Survey Monkey and both carrier and price information were requested, and the speed test became a required item for completion of the survey. The speed test(s) that was administered was the one on the Federal Communications Commission web site.

PCI worked with a number of organizations in gathering data for these submissions. We are encouraged that the relationships with these organizations have continued to develop and facilitate other facets of our organization. These organizations are listed below:

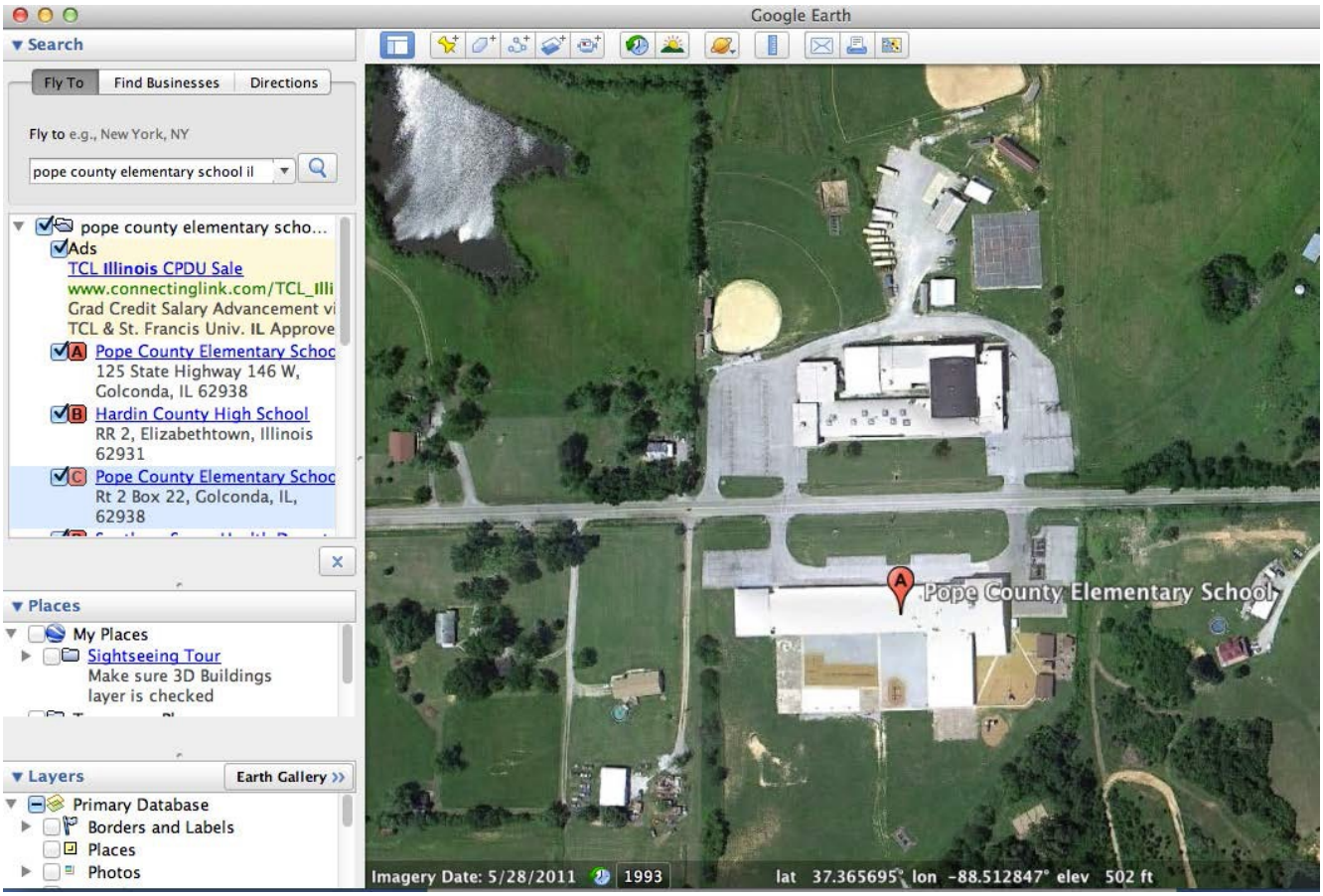
K-12	Illinois Association of Regional School Superintendents, Illinois State Board of Education
Libraries	Illinois Library Association
Healthcare	Illinois Critical Access Hospital Network, Illinois Rural HealthNet, Illinois Healthcare Association
Public Safety	Existing Database
Colleges & Universities	Illinois Community Colleges Board
Other Government	Existing Database
Other Non-Government	Illinois Workforce Development

In Round 4, as opposed to previous rounds where PCI submitted secondary CAI's that did not fit perfectly into NTIA parameters, PCI decided to submit only those CAI's that clearly fell into the seven categories laid forth by the NTIA. This led to a significant decrease in the total number of CAI's submitted, but a significant increase in the quality of the data that was submitted.

For example, of the 26,599 locations submitted in April 2011, there were 14,000 Category 3 Healthcare locations which were geocoded, yet had no connectivity data. Many of these were for actual practitioners as opposed to clinics, or what might be considered institutions. PCI elected to remove this larger number for the October filing. PCI also removed duplicates where they existed in the other categories. For instance, the previous mapping contractor included a record for each individual college and university in both the K-12 and Higher Education categories. PCI felt it made sense to include only one record of this category in only the Category 5 Higher Education category.

Also, in Round 4, PCI enhanced the quality of the data in the K-12 category through the use of an eRate database that showed what schools had applied for the eRate and what providers were servicing their location. This allowed PCI to populate the BBService and TransTech fields for those CAI's.

In Round 5, a total of 787 anchor institutions geocoded to the center of the city due to rural route addresses, PO Box addresses, slight misspellings, and/or incomplete addresses. All 787 of the anchor institutions were individually mapped using Google Earth software. The mage below shows a county elementary school with a rural route address. In previous rounds, the anchor institution geocoded to a location within the county but 15 miles away from the actual anchor institution. In round 5, the latitude and longitude that was indicated in Google Earth was captured.

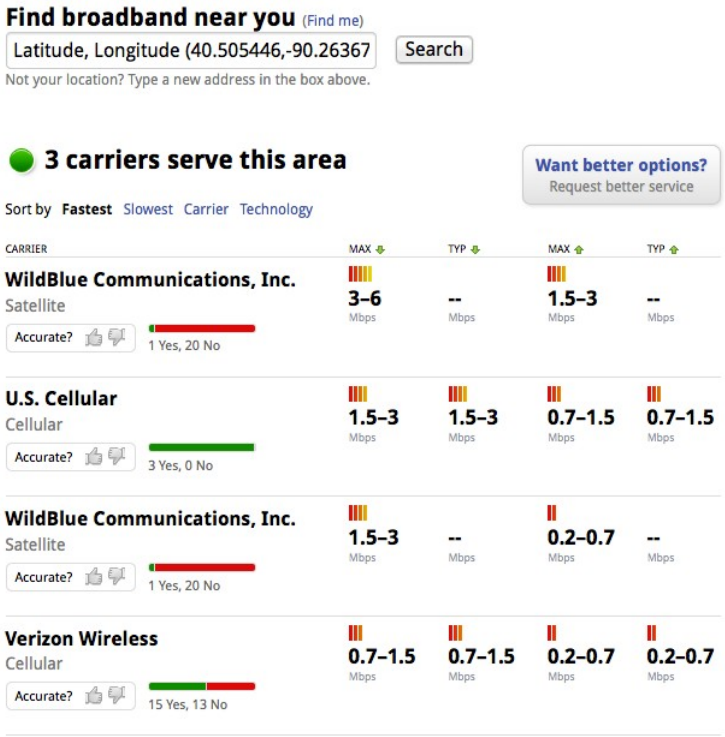


Since this process resulted in moving the geometry of the issue CAI points, the associated attribute table XY coordinate pair values were recalculated to accurately reflect the new point locations. Corresponding census block code (FULLFIPSID column) values were likewise recalculated via a spatial join between the CAI points and the 2010 census block layer.

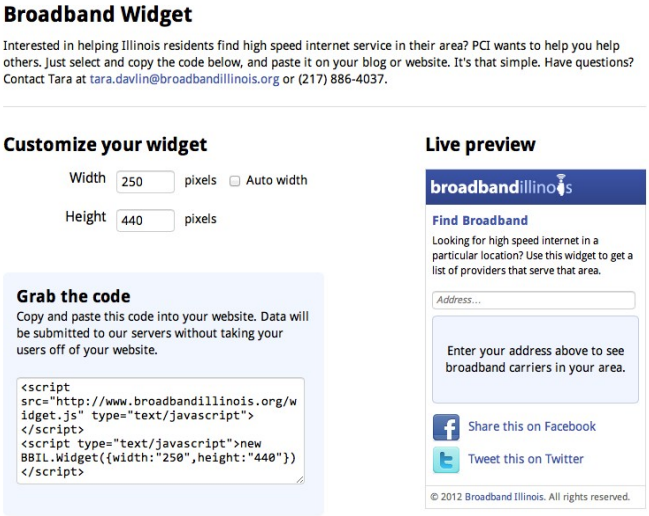
BROADBAND ILLINOIS WEBSITE

The Partnership for a Connected Illinois is constantly expanding and improving our website. Since October of 2012, our additions and improvements include:

- **Coverage crowd sourcing** – When a user searches for available broadband on broadbandillinois.org, carrier information is displayed. Users can now vote with a "thumbs up" or "thumbs down" on the validity of the carrier reported speeds and availability.



- **Embeddable Widget** - The addition of an embeddable widget to be placed on any website or blog, and allows anyone to find broadband by entering an address



- **Newsletter Pages:** PCI has a weekly newsletter that is sent to a group of broadband enthusiasts and stakeholders. We have devoted a section of our website to these newsletters so that they may be accessible anytime.
- **County Pages:** We have created a page for each and every county in Illinois. These pages contain the latest coverage maps, as well as a link to each carrier page available in that county.

- **Carrier Pages:** We have created a page for each carrier in Illinois. Each carrier page contains the latest coverage maps as well as contact information for each carrier.
- **Maps:** We continue to make more and more of our maps available online. We have added all previous rounds' raw data files and shape files, as well as broadband competition maps, and area ranking maps.
- **Events Page:** Our "Events" page technology has been upgraded to allow for easier downloads through iCal and Google Calendar. Users can also subscribe to specific categories through our RSS feeds.
- **Videos**: We have added multiple videos to our site to allow this additional medium to relay our messages regarding grant opportunities, broadband adoption, and carrier relationships.

Upcoming Additions

- "**Census Block Concept"** - We are currently working on a major upgrade to our website that will allow users to easily search all available data (news, events, training, coverage maps, carrier information, grant and employment opportunities) by region, county, zip code, address or even census block.

  Due to the size of Cook County, with this addition each of the 77 Chicago neighborhoods will have their own broadbandillinois.org page where users can find pertinent information for their local area, and not just Chicago-wide data.

- **Blogs** - Each region will have its own blog, where eTeam coordinators can communicate publicly and private with their volunteers and members.

- **Public Wi-Fi Locations -** PCI has been awarded the Institute for Emerging Issues' Rural Digital Advocacy Grant to build a Wi-Fi locator mobile application. We have been working with a company called Softweb to develop the iOS and Android app variants. We have also partnered with the University of Illinois Extension to collect Community Anchor Institution (CAI) and Wi-Fi hotspot data for the app. The Wi-Fi app is scheduled to be completed in the next couple of weeks, and should be released soon.

-

- **Raw Data –** The web site provides access to raw, non-confidential data submitted to NTIA as well as analysis data produced in-house.

PCI's web site is built around an open source Application Program Interface. This free tool allows software developers to build upon, and add to, the data on the Broadband Illinois website. Documentation for the PCI's API is available at http://developer.broadbandillinois.org.

CONCLUSION

The data submission cycle ending on April 1, 2013, has been the fourth round that the Partnership for a Connected Illinois has conducted every facet of the data collection process. PCI is confident many of the issues that were found in previous PCI submittals have been resolved thanks in large part to the experience of previous rounds. Now that PCI has assumed full control over this process, it has brought the data "closer to home" for Illinois. PCI has taken major steps in its three-fold mission to collect and publish broadband data, to ensure broadband access throughout the State, and to maximize broadband's impact, and the data has helped drive each of these steps.

Appendix

Partnership for a Connected Illinois Annual Report 2012.

Partnership for a Connected Illinois

broadbandillinois.org

AnnuAl RepoRt 2012

Convene, Connect, Collaborate

Rural buyers of fiber to the home; an X-ray technician using broadband at Hardin County General Hospital in the heart of the Shawnee Forest; gigabit project meeting on Chicago's South Side; mapping telecom infrastructure in Western Illinois; reception at the new Broadband Illinois offices. *(Clockwise from upper left.)*

From the executive Director

Broadband has the power to transform our lives. Illinois is leading the way.

A Big Year for Broadband in Illinois

In 2012, we saw major expansions and upgrades in high-speed Internet infrastructure in Illinois. Our Broadband Illinois web site, supported by the U.S. Department of Commerce's State Broadband Initiative, began to accellerate its return by giving providers and economic development officials the tools they need to get their communities connected—and in 2012 their joint efforts lit the way for signifcant advances in Illinois broadband.

Our **eTeams** field support personnel are now active in all 10 of the State's economic regions. They have been busy throughout 2012 facilitating new efforts in high-capacity broadband deployment, such as the **Illinois Gigabit Communities Challenge** launched by Gov. Pat Quinn on February 1, 2012. This program is gaining national traction; by the end of the year, the the Federal Communications Commission had launched its own **Gigabit City Challenge**.

Throughout 2012, Broadband Illinois pushed aggressively into cooperative programs that encouraged broadband education and usage. Our $500,000 **Broadband Innovation Fund** prompted 14 entrepreneurial and community organizations to launch programs that leveraged more than $2 million in investment capital.

These Partnership for a Connected Illinois programs are promoting, and will continue to promote in coming years, jobs, education, agriculture, civic engagement, and healthcare – through broadband. They are presently funded through an award from the U.S. Small Business Administration and the Illinois Department of Commerce and Economic Opportunity.

Most recently, on December 19, 2012, we received word from the FCC of support for our **Better Broadband, Better Lifeline** pilot program. In partnership with seven telecommunications companies in Western and Southern Illinois, we have been chosen to invest $1.5 million to help low-income Illinoisians to gain access to broadband services.

We work in partnership with each of you, and we rely on each of you in our common goal of building *Better Broadband, Better Lives*. The year 2013 is poised to be an even bigger, and better success. This annual report outlines our activities in 2012.

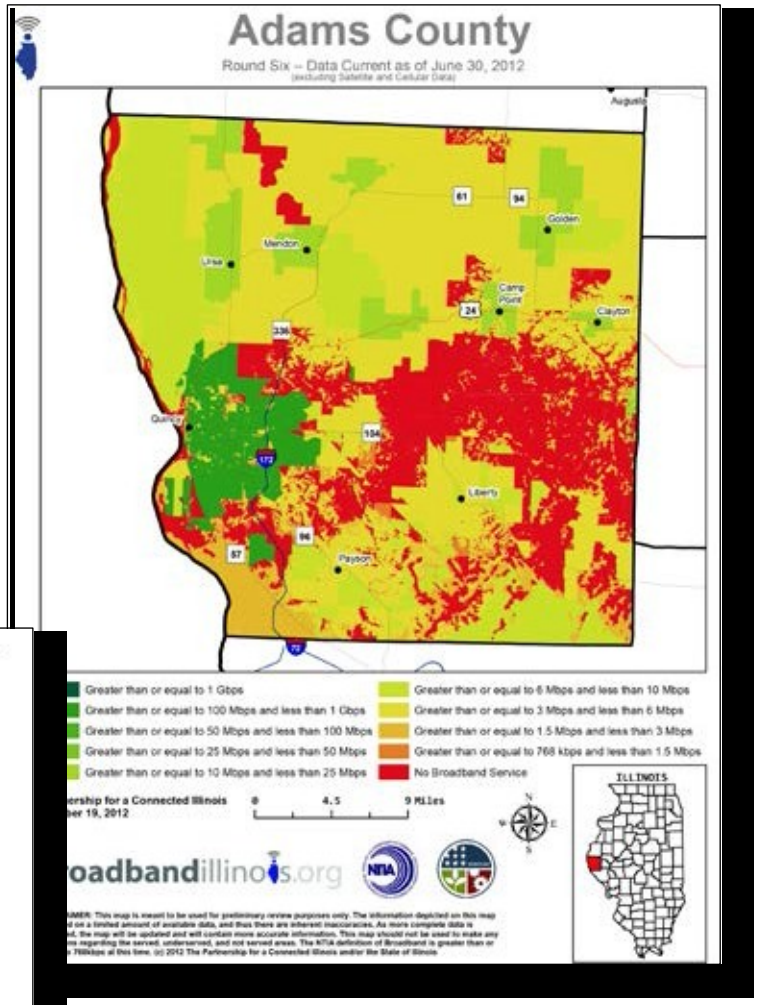
Drew Clark

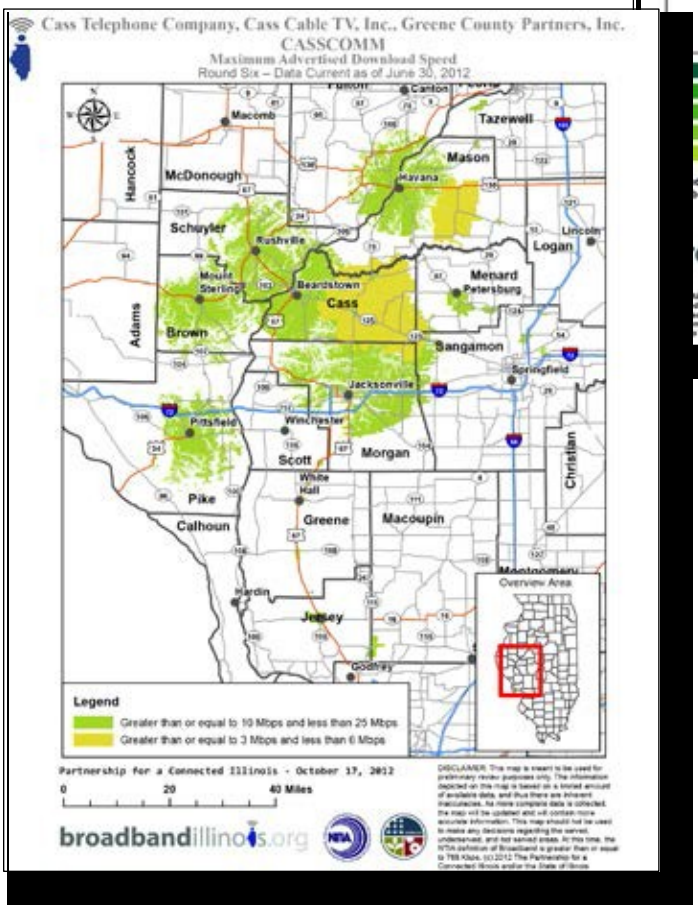
Executive Director

Visualizing Broadband

What We Do

Broadband mapping and data collection is a backbone of our organization. Our Geographic Information Systems team contacts each Illinois broadband provider and creates detailed, interactive census-block level maps of broadband speed and availability throughout the state.





Why We Do It

Our regional eTeams help broadband providers identify areas that are in need of service. Our **Find Broadband Tool** and **Request Broadband Tool** allow users to enter a street address to see all available broadband carriers in their county. And economic developers, government officials and other businesses are discovering creative uses of broadband data for promoting healthy communities and regions.

"Broadband Illinois mapping is the first area we look at when deploying new towers."

- nathan Stooke, Ceo, Wisper ISp

broadbandillinois.org provides the tools that Illinois needs to get online.

Find Broadband

Our data helps users get service and providers find customers. In 2012, more than 60,000 users visited our web site, viewing more than 176,000 pages. The **Find Broadband Tool** enables users to learn about broadband services, speeds and community broadband centers in their area.

"We have gained customers who were unaware of Joink and found unserved areas to more strategically plan how to get high speed Internet to those who have none."

-Brian Gray, Joink llC, Connectivity Manager

Request Broadband

Adequate service isn't always available. Our **Request Broadband Tool** can help. more than13,000 users took advantage of these tools in 2012. Our request tool sends alerts to all the providers of broadband in the user's county. Providers are then able to identify pockets of aggregated demand and work out economical and strategic methods to reach these new customers.

"The growth rate of Illinois' connectivity, particularly its commercial subscribers, is due in large part to the important efforts of Broadband Illinois to develop a network of support, track real-time data and support projects on the ground in the most-needed areas."

-Alya Adamany Woods, Director of Innovation and Special Initiatives, Illinois Science and technology Coalition

For more information:

http://broadbandillinois.org/maps

eteams from Shawnee Forest to Michigan Avenue

In 2012, Broadband Illinois' **eTeams** convened economic development officials and providers of broadband in each of10 regions of the State to create grassroots action plans for *Better Broadband, Better Lives*.

The work of our eTeams is incredibly diverse. From the most remote areas of the Shawnee Forest to Chicago's Michigan Avenue, eTeam coordinators are "in the field" each day, promoting the significant benefits of high-speed internet service.

eTeams have helped connect individual users, hospitals and schools. They've worked with economic developers and local businesses. And they maintain close relationships with providers and local businesses. The goal is to expand broadband infrastructure and connect more Illinoisans.

In Chicago, we continued efforts to increase broadband education. Major initiatives focused on ensuring the city is one of the most connected in the world. From Mayor Emanuel's **Chicago Broadband Challenge** to the gigabit infrastructure projects recently announced in Chicago's South Side, and in Aurora and Evanston, Broadband Illinois eTeams convened, connected and collaborated with key stakeholders in each region.

eTeam director Brad Housewright *(center)* **conducts a meeting in Carthage.**

2012 eTeam Highlights

- Helped create partnerships and form gigabit-level broadband plans for 17 of 40 **Illinois Gigabit Communities Challenge** applicants.
- Assisted in increasing the number of **Eliminate the Digital Divide** grant applications from 168 to 321.
- Launched the **Illinois Broadband Innovation Fund** throughout each eTeam region, generating 113 applications for creative broadband adoption programs during the innovation fund's first year.
- Hosted industry-specific regional broadband gatherings and summits on education, healthcare and agriculture.
- Utilized Broadband Illinois' mapping and data to host provider meetings and identify pockets of aggregated demand in underserved regions, allowing providers to see new areas for business.
- In 2012, we convened broadband events in each of our 10 eTeam regions. Broadband providers, economic development and government officials, community leaders, business owners, and others attended these eTeam events.

For more information:

http://broadbandillinois.org/eteams

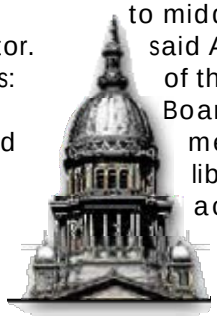
"At an eTeam meeting in the Northwest and North Central region, eTeam coordinators showed me a regional speed-tier map. I noticed a few areas were 'red' and that we would be able to serve them. We built towers in these areas and got high-speed, fixed wireless service to these residents. Our newest tower in Cullom (population 563) was lit by Christmas!"

- Cesare Bratta, president, Cyber Broadcasting llC in Coal City, Illinois

Staffing the Broadband Deployment Council

Founded in 2005 by then Lt. Governor Pat Quinn, the **Broadband Deployment Council** works to improve access to broadband networks for residential consumers and public, private, and nonprofit organizations in Illinois.

The BDC has more than 20 members, including appointees from Illinois government and the private sector. The council has three committees: Access and Infrastructure, Adoption and Use, and Information and Research.



"The Broadband Deployment Council has been instrumental in moving the State of Illinois into a competitive broadband technology region," said Herb Kuryliw, Chief Network Architect for Northern Illinois University, and a council member.

Meetings are conducted on a quarterly basis and address infrastructure projects, right-of-way issues and the needs of community organizations like libraries and hospitals. Broadband Illinois facilitates and staffs the Broadband Deployment Council, and meetings are open to the public.

"Public libraries face a crisis in providing high-speed access to library users due to middle mile and last mile issues," said Alice Calabrese-Berry, President of the River Forest Public Library Board of Trustees and a council member. "Internet use in public libraries is sometimes the only access Illinois residents have in rural less populated areas. The Broadband Deployment Council is determined to allow for more digital inclusivity by expanding broadband across the state."

For more information and past agendas:

http://broadbandillinois.org/events

"Our schools are increasingly turning to the web to learn, adding computers in the classroom, and putting more courses and instructional materials online. We need widespread high-speed Internet connections to handle that demand. Broadband Illinois has taken on the online testing issue in working with the Illinois State Board of Education."

-John Meixner, Regional Superintendent of Schools, Hancock & McDonough Counties of Illinois

Working to eliminate the Digital Divide in Illinois

The Digital Divide prevails in areas of Southern and Western Illinois, where less than 60 percent of residents use high-speed internet at home. This was discovered in a research project undertaken by Broadband Illinois and subseqently published in a report release in November 2012,"Broadband Adoption In Illinois." Identifying who has high-speed internet, who doesn't and how broadband adoption can be expanded to more Illinois homes were key themes of the study, led by Broadband Illinois Research Director John Horrigan, Ph.D.

The study provides a breakdown of broadband adoption and usage patterns for all 10 of our eTeam regions. It shows why some Illinoisans aren't connected. Overall, the data revealed that 68 percent of Illinois adults surveyed had broadband at home, as well as 56 percent of African Americans and 56 percent of Hispanics. However, in four eTeam regions - Northwest, Southeast Central, Southern and West Central - home broadband rates were less than 60 percent. The 32 percent of Illinois adults without broadband at home tend to be older, more rural and have lower incomes than broadband users in the state.

John Horrigan

The report also provided details on the emergence of mobile and smart phone usage. Smart phones are cited as a "strong foothold" in how Illinoisans are accessing the internet and adoption rates are particularly high for African American (52 percent) and Hispanic (60 percent) users.

The full report and regional breakdowns are available for download at http://broadbandillinois.org/research

Our "Better Broadband, Better Lifeline" pilot program *(see page 12)* will help to address these disparities through efforts to promote broadband usage in Western and Southern Illinois.

Raising the Bar on Broadband Speeds

Broadband is about more than basic internet speeds for e-mail, Skype and social networking. Broadband is about high-bandwidth capacity. It's also about immersive telepresense systems, cloud computing for advanced manufacturing, and biomedical health monitoring. Broadband Illinois is raising the bar on bandwidth. In 2012, we worked to promote gigabit-level broadband connections by working in partnership with Gov. Pat Quinn's **Gigabit Communities Challenge.**

Unveiled in the State of the State address on February 1, 2012, the Gigabit Communities Challenge presented $6 million in funding to companies or private-public partnerships that proposed innovative ways to connect at least 1,000 end-users to gigabit-level broadband. The first three winners have been selected: Gigabit Squared, in partnership with Cook County, the City of Chicago, and the University of Chicago, received $2 million to deploy gigabit fiber and wireless to neighborhoods in Chicago's South Side. OnLight Aurora and Northwestern University/City of Evanston also each received $1 million each to help connect their cities.

For more information:

http://broadbandillinois.org/gigabit

Government
Broadband provides more accessible and transparent services to citizens.

Gov. Pat Quinn announcing the first recipient of the Gigabit Communities Challenge in the Woodlawn neighborhood of Chicago.

ILLINOIS GIGABIT COMMUNITIES CHALLENGE

Nor should we forget the considerable ongoing investment in broadband fiber upgrades made through the **Broadband Technology Opportunities Program** of the U.S. Department of Commerce, and the **Broadband Infrastructure Program** of the U.S. Department of Agriculture. From 2009 until 2013, more than $350 million in federal, state and private investment has enhanced the capacity of private companies and public-private organizations in the construction of new fiber infrastructure in Illinois.

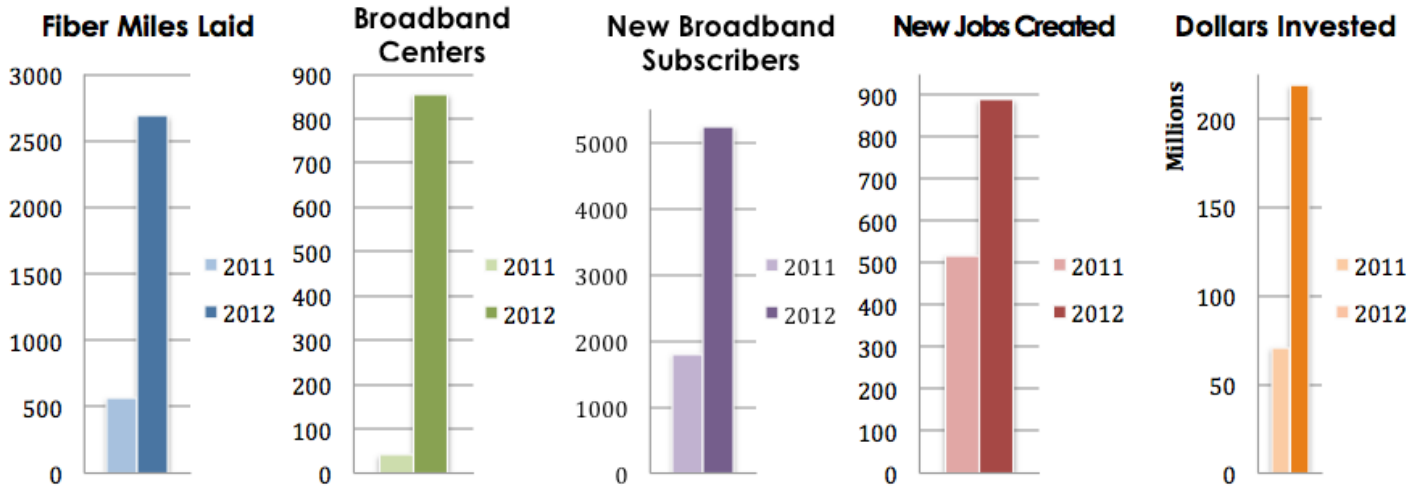
In Broadband Illinois's role as the non-profit designated State Broadband Initiative entity, we play a key oversight role over these projects. We compile monthly reports that provide accountability and document progress in building infrastructure and boosting subscribers. For example, Southern Illinois awardee Shawnee Communications began connecting community centers in the fall of 2011, and had completed their build-out by May 2012.

"From participating in our strategy and visioning sessions to coaching us through our team development; from touring the anchor institutions to hosting the webinar that lifted up our work, Broadband Illinois has been there to promote and inform our broadband infrastructure plan that will support the Woodlawn community vision."

-pierre Clark and laura lane, Co-Directors, Woodlawn Broadband expansion partnership

Metrics for State-wide Broadband Success

this Broadband Illinois dashboard showing progress by federal broadband stimulus projects is updated monthly at http://broadbandillinois.org/projects



"Broadband Illinois has been dedicated to expanding broadband to the underserved and unserved communities of Illinois. They continue to work with the providers and communities in our region to push for the availability and adoption of broadband, and for expanding the opportunities for all people in our region."

- Bill Buchanan, Vice president of operations, McDonough telephone Cooperative

the Illinois Broadband Innovation Fund

The **Illinois Broadband Innovation Fund** is a key project that defined much of our work in 2012 and received attention on a statewide and national scale. The first-of-its-kind internet adoption and usage program prompted 113 private, public and nonprofit organizations to create innovative applications aimed at improving the quality of life in their region. In October, the Innovation Fund awarded $500,000 to 14 organizations throughout Illinois.

The program complimented other initiatives focused on infrastructure (like the **Illinois Gigabit Communities Challenge**, *page 8.*) and encouraged entrepreneurial and nonprofit organizations to ask "Now that we have broadband, can we use high-speed connections to make a difference in our region?"

The Broadband Innovation Fund gave Illinoisans a platform to think creatively about high-speed Internet usage. We received applications aimed at using broadband to improve everything from agriculture and energy to telemedicine and public safety.

In Carlinville School District, students are learning digital story-telling and preservation skills though interviews with local WWII Veterans. The Broadband Innovation Fund will allow the Illinois Veterans Classroom Project to expand to four other schools and create online professional development modules.

program Manager Anne Madonia-Hubbard

The City of Monmouth is creating the Warren County Virtual Museum and will share the web application with other communities in Illinois.

In Chicago, the Family Christian Health Center will create a patient web portal to allow local underserved residents better access to their primary care providers.

And in rural Central Illinois, Integrated Therapy Services will use broadband to provide specialized health and education services to families that wouldn't have access otherwise.

For more information (details, videos, slides):
http://broadbandillinois.org/innovation

Agriculture
Farmers sell and manage their crops, and monitor weather forecasts.

"Broadband Illinois has facilitated contacts between the Illinois Rural Health Network and rural hospitals and clinics, so that new possibilities for improved health care can be brought to fruition."

- Doug power, project Coordinator, Illinois Rural Healthnet

public Safety
Faster and more efficient fire and police response relies on better broadband.

energy
The "smart grid" improves reliability and provides savings.

Healthcare
Rural residents consult with doctors and specialities via internet video.

"Broadband Illinois is a valuable partner in strengthening our regional economy so that our communities, both urban and rural, can prosper."

-nick Hayward, planner, tri-County Regional planning Commission

entrepreneurship, Agriculture & Digital Skills

Preparing high-school students in rural Illinois to be self-reliant, enterprising and innovative are foundations of the Creating Entrepreneurial Opportunities class (CEO) based in South Central Illinois. In its 5th year, the widely-successful CEO class is currently open to students in Effingham county with an interest in becoming leaders. As a **Broadband Innovation Fund** awardee, the program will grow and replicate its successes in other areas.

"Thanks to the Broadband Innovation Fund, we'll be able to expand to communities that otherwise might not have been able to afford launching a CEO program," said Craig Lindvahl, head of the Midland Institute for Entrepreneurship and class instructor. "In our day-to-day work, broadband is essential for learning, teaching and interacting."

CEO classes aren't conducted in a typical classroom. Instead, students travel to local business each week and engage with local entrepreneurs who are tackling real world problems. Though hands on learning, each CEO student creates a business plan using a laptop, high speed internet, and interactive web collaboration tools. To date, about 80 real life businesses have been started by young entrepreneurs, adding to the economy of rural Central Illinois.

Job Creation
Businesses grow by locating in areas with broadband.

Molly neimerg, a Ceo student, discusses a project with local businessperson Ann Deters.

"We recently partnered with the Effingham Helen Matthes Library and University of Illinois Extension representatives to pilot Connecting Generations, a community volunteer program that matches tech-savvy school students with area seniors to learn Internet skills. Through a Broadband Innovation Fund award, our partners are now working to expand student-to-senior mentoring program to 10 other public libraries in the region."

-Jean Anne Grunloh, executive Director, east Central Illinois Development Corp.

Western Illinois university Agriculture Department personnel use sonogram technology to examine sheep.

Makayla, an eighth-grade student, and nancy learn to Skype at the Helen Matthis Library in Effingham.

A lifeline For low Income Broadband

In December, the Federal Communications Commission announced that residents in 35 rural Illinois counties are set to receive $1.5 million in discounted internet services, digital literacy training, and low-cost internet devices. The goal is to study the effects on users as the FCC transitions to providing low-cost phone service to broadband technology.

Broadband Illinois' pilot program **"Better Broadband, Better Lifeline"** is designed to target citizens who need broadband the most—the 37 percent of Illinoisans without high-speed connections at home. We've also made sure to address each of the three barriers to getting low-income individuals online: cost, digital literacy and relevance.

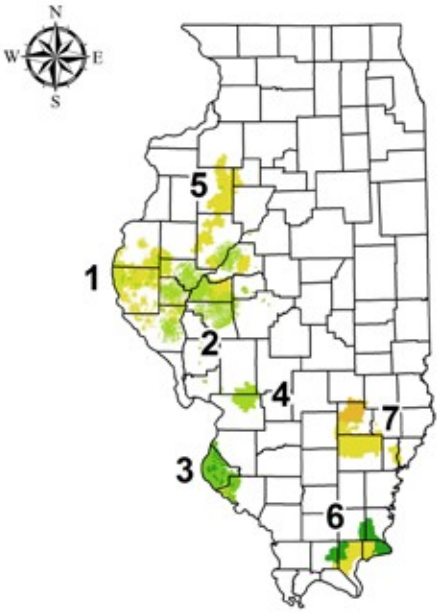
Through convening seven broadband providers, two world-class training entities, and the marketing muscle of our on-the-ground regional eTeams, we'll have the opportunity to show how Better Broadband can can enhance individual lives.

For those eligible, one-on-one digital literacy training and outreach will be provided by Broadband Illinois, Connected Living and the Citizens Utility Board.

For more information:

http://www.broadbandillinois.org/lifeline

Regional eteam leader Barbara Webster and Kim Harber



Participating Providers:

1. Adams Networks
2. Cass Communications Management
3. Harrisonville Telephone Cooperative
4. Madison Communications
5. Mid Century Telephone Cooperative
6. ShawneeTelephone Cooperative
7. Wabash Telephone Cooperative

"As we continue to develop the synergies brought about by private sector investment, the governor's Broadband Deployment Council and the FCC's lifeline pilot, Broadband Illinois can facilitate and coordinate the "think tank" leadership required to address the expanding role that technology will play in successful community and economic development efforts throughout every region of Illinois."

- Kim Harber, Vice president, Madison telephone

education
Students do homework and take courses online.

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Bruce Montgomery speaks during a press conference at which Gov. pat Quinn announced evanston would receive a $1million Gigabit Communities award.

Charles Benton, left, receives the everett C. parker ethics in telecommunications Award.

Karen poncin greets guests at an eteam meeting.

"Broadband Illinois has played a major role in laying the groundwork for new partnerships with communities, businesses and organizations seeking enhanced broadband services. Convening internet service providers alongside community and organizational leaders has created a new conversation. By working together, service providers and communities are finding new ways to help each individual and to increase broadband adoption."

-Kathie Brown, extension educator, Community & economic Development, university of Illinois extension

Broadband Illinois Staff

Regional eTeam Leader Clayton Black, Brad Housewright, Drew Clark and Gov. Pat Quinn's Deputy Chief of Staff Ryan Croke; Gov. Pat Quinn and Regional eTeam Leader Ernie Sanders; Drew Clark explaining broadband at the Illinois State Fair in Springfield; on the Broadband Innovation Tour. *(Clockwise from upper left.)*

DREW CLARK | Executive Director
CLAYTON BLACK | Regional eTeam Leader
LACEY BUSS | Administrative Coordinator
STEVE DRYDEN | GIS Database Technician
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DAN GAVRILOVIC | GIS Database Technician
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BRAD HOUSEWRIGHT | eTeam Director
DAVID KRAUS | Technical Support
AMY LAWSON | Administrative Associate
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CONSULTANTS:
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JEFFREY PIRMANN | Director of Finance/Administration
DEBORAH STRAUSS | Consultant
BRIAN WEBSTER | Telecom Project Coordinator

Broadband Illinois partners

Below is a sampling of the businesses, foundations, economic developers, plus the community and civic organizations with whom we have partnered.

Broadband Illinois is located on the fifth floor at
531 East Washington St. in downtown Springfield, Illinois,
across the street from the Old State Capitol building.

Contact us

Phone: (217) 886-4228
Fax: (217) 718-4546
info@broadbandillinois.org
http://broadbandillinois.org

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Geological Information Officer

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Round 7 (Spring 2013)
Data Submission to NTIA
April 1, 2013

Data Description File Name	Contents	Description
IN_SBDD_20130418.ZIP	This Delivery Package	A zip file containing all of the files described below
IN_SBDD_2013_04_18.gdb	Data Transfer Model	Current NTIA approved data model with the assembled data properly loaded into the data transfer model
IN_DataPackage. 2013_04_18.xls	Data Package	A formatted file containing associated documentation about Indiana's submission
IN_2012_04_18.txt	Data Submission Receipt	File containing the results of the submission check tool
IN_ Methodology _2013_04_18.pdf	Methodology White Paper	Documentation about our process
IN_ Readme_2013_04_18.pdf	Readme Doc	A document that contains added notes about the delivery

Provider Participation

122 Internet Providers

- 64 Wireline Providers
- 58 Wireless Providers

41 Data Sets Received

- 23 Wireline Providers
- 18 Wireless Providers

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About this Submission

112 Broadband Providers in State of Indiana

- Some organizations have more than one name (for a total of):
  - 122 Internet Providers
    - 64 Wireline Providers
      58 Wireless Providers

Provided New Data:

- **AT&T, Inc.**
- **Bright House Networks, LLC**
- **CenturyTel, Inc./CenturyLink/Embarq**
- **Cequel Communications, LLC/Suddenlink/NewWave**
- **Clay County Rural Telephone Cooperative, Inc./Endeavor Communications**
- **ClearWire**
- **Comcast Cable Communications Management**
- **Community Wireless**
- **Covad Communications Group, LLC/DIECA Communications/MegaPath**
- **Echo Wireless**
- **Enhanced Telecommunications Corporation/ (Sunman Telecommunications Corp) ETC Communications**
- **Fourway Computer Products, Inc.**
- **Frontier Communications**
- **Indiana Fiber Network**
- **Joink, LLC/XSNet**
- **Leap Wireless International, Inc./Cricket Communications/Denali Spectrum License Sub, LLC**
- **Level 3 Communications, LLC (Purchased Global Crossing North America, Inc.)**
- **Ligonier Telephone Company**
- **Ligtel Communications**
- **Mediacom Communications Corp.**
- **MetaLINK Technologies, Inc.**
- **Metronet**
- **New Lisbon Telephone Co., Inc.**
- **New Wave Communication**
- **NITCO Holding Corporation/FBN Indiana, Inc. (Northwestern Indiana Telephone Company)**
- **Ohio Valley Wireless purchased by Sit-Co.net (Sitco)**

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- **On-Ramp Indiana (ORI Net)**
- **Performance PC / Performance WISP**
- **Perry-Spencer Rural Telephone Coop (Communications)/PSC**
- **Portative Technologies, LLC**
- **Rochester Telephone Co./RTC Communications**
- **Smithville Telephone Company, Inc.**
- **Southeastern Indiana Rural Telephone Coop.**
- **Sprint-Nextel Communications**
- **Telephone and Data Systems, Inc. (TDS)**
- **Time Warner Cable LLC**
- **T-Mobile**
- **TransWorld Network, Corp./Wi-Power**
- **Verizon Wireless**
- **Washington County Rural Telephone Cooperative/Tele-Media Solutions**
- **Zayo Enterprise Networks**

Data Still Current:

- ABC Hi-DEF Communications/ Broadway Broadband
- Accelplus
- Benton Ridge Telephone Company/Watchtv.net/
- Bloomingdale Home Telephone Company
- Blueriver Networking Services
- Citizens Communications
- Citizens Telephone/City of Scottsburg
- Comteck
- Craigville Telephone Company, Inc./AdamsWells Telecom
- CSInet Internet Access
- Daviess-Martin County RTC/RTC Communications
- East Allen High Speed Internet, LLC/ Eastern Indiana WIFI, Inc.
- Foundation Communications
- Full Choice Communications, Inc./Indiana Communications
- FULLnet
- Geetingsville Telephone Company, Inc.
- Great American Broadband /Only Internet.net/MapleNetBroadband
- Hancock Rural Telephone Corporation/Nine Star Connect
- Helix Technologies Incorporated/NetSurfUSA, Inc.

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- Hoosier Broadband
- Internet Communications Inc
- KC Online, Inc.
- Kendallville Internet
- Lightbound
- Metro FastNet
- Microdome Wireless
- MidwayNet.net
- Monon Telephone
- Mulberry Cooperative Telephone Co. Inc.
- New Paris Telephone Co., Inc./Brightnet of Indiana
- NewWays Networking, LLC
- NITLine (Northern Indiana Technologies, Inc.)
- Node 1 Technology/Wireless Internet for Illiana
- Omnicity (Broadband Networks) - new company
- Parallax Systems (RMC)
- PCS-WIN / RC-WiFi
- PDS Wireless/Precision Data Solutions
- Pulaski White Rural Telephone Coop., Inc.
- Skycasters Satellite Internet
- StarBand
- Swayzee Telephone Company
- TV Cable of Rensselaer & Winamac
- Wabash Mutual Telephone Company (Part of Brightnet)
- WideOpenWest
- WildBlue Communications, Inc.
- Windstream Communications
- Wintek
- Yeoman Telephone Co.
- Zig Wireless

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Awaiting Data

- AirHOP Wireless
- DC Tech Solutions, LLC
- Locl.Net
- Michiana Wireless
- OINC Wireless
- SpeedNet/Keyon
- State of the Art Communications
- Total Logic Systems (TLS.net)
- YDial LLC

Will Not Provide Data:

- Airbaud (Magnum Wireless)
- Midwest Telecom of America, Inc.
- One Communications Corporation (Now EarthLink Business)
- Broadband Indiana
- Midwest Telecom of America
- Indiana Data Center/Metrolan

Updated Information:

- True 802 Wireless – will not be providing data as they have been purchased by someone that we are already working with (currently confidential).
- Broadband Blue – evaluating their information – trying to determine if they are a provider or reseller (and bundler in the state of Indiana).
- Pavlov Media, Inc., - evaluating their information – trying to determine if they are a provider or reseller (and bundler in the state of Indiana).
- LightningNet – organization previously reported as will provide data – now out of business.
- Brighthouse Networks – significant increase in their data. They had not updated their data since Fall of 2011.
- Sprint/Nextel - There were significant changes. They added 3G coverage in the north and they added some large markets for their LTE service.

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- Approximately 150K increase on the blocks and about a 400K increase on the address points

Data Collection

We continue to collect and compare data from these sources, including:

- The Indiana Utility Regulatory Commission (comparison broadband data)
- Office of Utility Consumer Counselor (comparison broadband data)
- The Indiana Business Research Center (demographic data)
- Indiana Department of Local Government Finance (residential versus commercial status by address)
- Indiana Counties (point addresses, land parcels, road centerlines with address ranges, and administrative boundaries, aggregated and integrated into the IndianaMap)
- Indiana Department of Natural Resources (state forests and parks)
- Indiana Department of Homeland Security (locations of emergency medical service (EMS) stations, fire stations, and hospitals)
- Department of Education (school locations)
- Indiana Libraries (point of connectivity for low income/unemployed consumers—provide vital speed information for respective geographical locations)
- Commission for Higher Education (locations of colleges and universities)
- Reference USA /Infogroup (community anchors)
- **Broadband service providers, and others**

This information is processed according to the current data submission model offered by the National States Geographic Information Council and to be able to perform spatial comparisons, logic rules and other checks.

We also add emphasis to the collection of speed information using the “crowd sourcing” web-based application already implemented.

Integration and Verification Processes Used in the Mapping Indiana Broadband Project Data Integration

When data is received from a service provider, it is loaded into either Excel or Access depending on the number of records and file size. This table is then joined with a copy of the Census Block *.dbf file from our census block shapefile. After the data has been joined, it is exported as a

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new *.dbf. The original Census block *.dbf is renamed to preserve the original integrity and the newly exported *.dbf is renamed to the same name as the shapefile. The shapefile is then loaded into ArcMap and a Feature Class is generated. The number of records is then validated against the number of records that were originally imported into either Excel or Access.

Data Loading: A final integration check occurs when the data is loaded into the data model. This includes the logic checks for values.

Validation Processes:

• ***Comparing source documents that duplicate geographies or content.*** We have public domain data that covers most of the state. We compare this data to that provided by the Internet Service Providers. We note areas of discrepancy for follow-up using other verification methods listed here.

• ***Collecting end-user data****.* We are working with The Polis Center at Indiana University Purdue University Indianapolis and have created a Google Map-based, user-friendly web application hosted on the IndianaMap portal to collect information from end-users about their location, broadband service provider, and speed (as captured from a speed test). The information collected from this website is valuable for data verification as the database grows.

• ***Using service providers' websites***, especially those that contain service area information. Many service providers have websites that give service area information (often address by address) to assist consumers. These sites are useful for spot checking.

• ***Inspection of high-resolution orthophotography.*** High-resolution orthophotography has been used to verify the existence and location of wireless towers. Where recent six-inch resolution orthophotography exists (cities and counties), it can also be used to verify the existence of residence connection boxes.

•***"Boots on the ground"*** inspection. We visually inspect the existence of physical features, where feasible, when we have a question or conflict that can be resolved by an on-site inspection.

Indiana Broadband Providers Website

A URL is available http://www.in.gov/gis/Broadband.htm to communicate and distribute NTIA NOFA requirements to providers along with outreach and data submittal materials including:

- NTIA NOFA and subsequent clarification
- Outreach letter to providers
- Non-Disclosure Agreement

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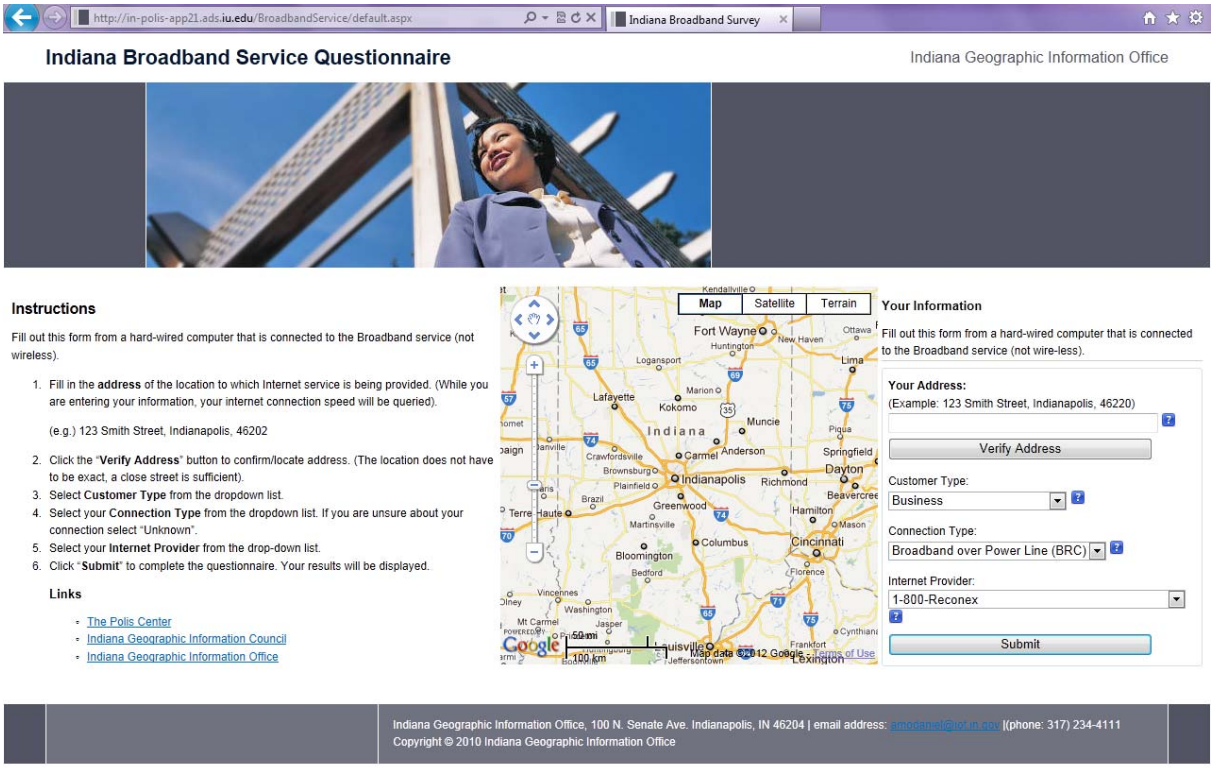
- Data Submission Guidelines
- Broadband Data Submittal Templates (Spreadsheets)
- Data Submittal Assistance Contact Information

Indiana Broadband Service Questionnaire

http://www.in.gov/gis/BroadbandQuestionnaire.htm

http://in-polis-app21.ads.iu.edu/BroadbandService/default.aspx

www.in.gov/survey



The information collected from this website is valuable for data verification. The Polis Center works with communities in Indiana and beyond to develop and apply knowledge, to build collaborations and to find innovative solutions to common problems. The center excels in community-based research and advanced information technologies, especially geographic information systems (GIS).

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Small Service Provider Support

We also support small service providers (and those with smaller information technology teams) in the area of data submission. We recognize the challenge that some providers have in submitting data in the formats and specifications required.

We have entered into a contract with AfterImage GIS to provide support to these providers in the area of data submission and assist with the challenges that some providers have in submitting data in the formats and specifications required by National Telecommunications and Information Administration (NTIA) for the National Broadband Map. Since we have engaged in this contract, we have been to acquire 12 new provider data sets.

Data Display

Indiana Map

We are currently displaying the mapping results as additional geospatial layers added to the 220-plus layers already on the IndianaMap (www.indianamap.org)

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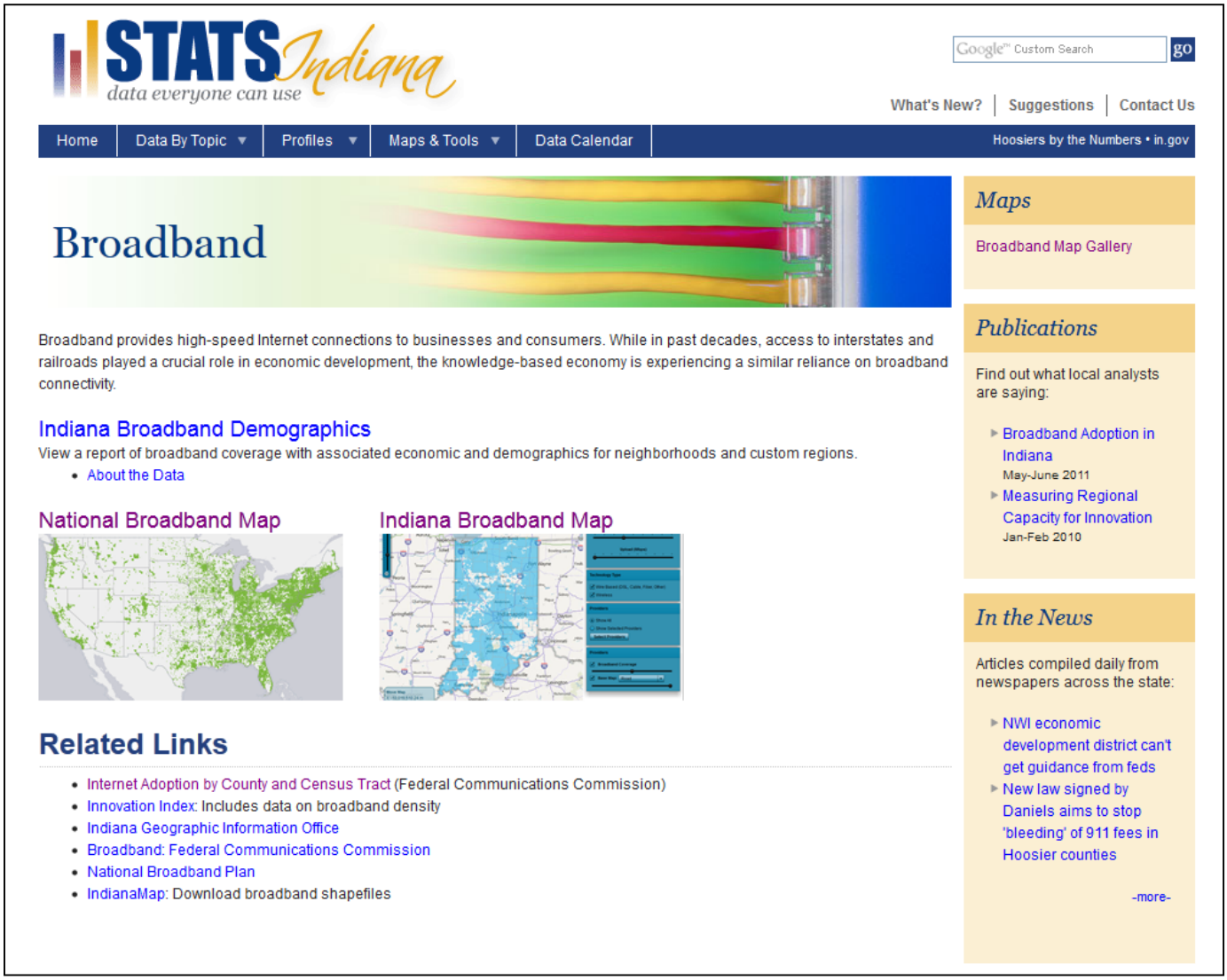
Indiana Business Research Center (IBRC)

We have integrated the broadband map data with economic data available from IBRC
www.stats.indiana.edu/broadband/



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Indiana Broadband Map

We have developed a web-based information tool that will provide information about broadband service availability at a user-specified location.

www.indianabroadbandmap.com

This application is provides tools for searching and displaying broadband availability information anywhere in Indiana.

Public Use

- Zoom to County
- Zoom to Address and retrieve Broadband Information for that address
- Buffer Address for additional Broadband Information in the area
- View Provider Results
- Filter Broadband Information by Speed
- Filter Broadband Information by Technology (i.e. Wireless, Wireline)
- Filter Broadband Information by Service Provider
- Query Census Blocks

Provider Use

- All of the above
- Edit Broadband Information via Secure Login
    - Multiple webinars were hosted by IOT and our web developer 39°north to train the broadband providers how to update their data. Each broadband provider was given their own unique login information. The website was then released to the public so that they can view the available provider information for their area.
    - Through this secure login, the original provider data may be modified to more accurately reflect the various broadband providers' territories.

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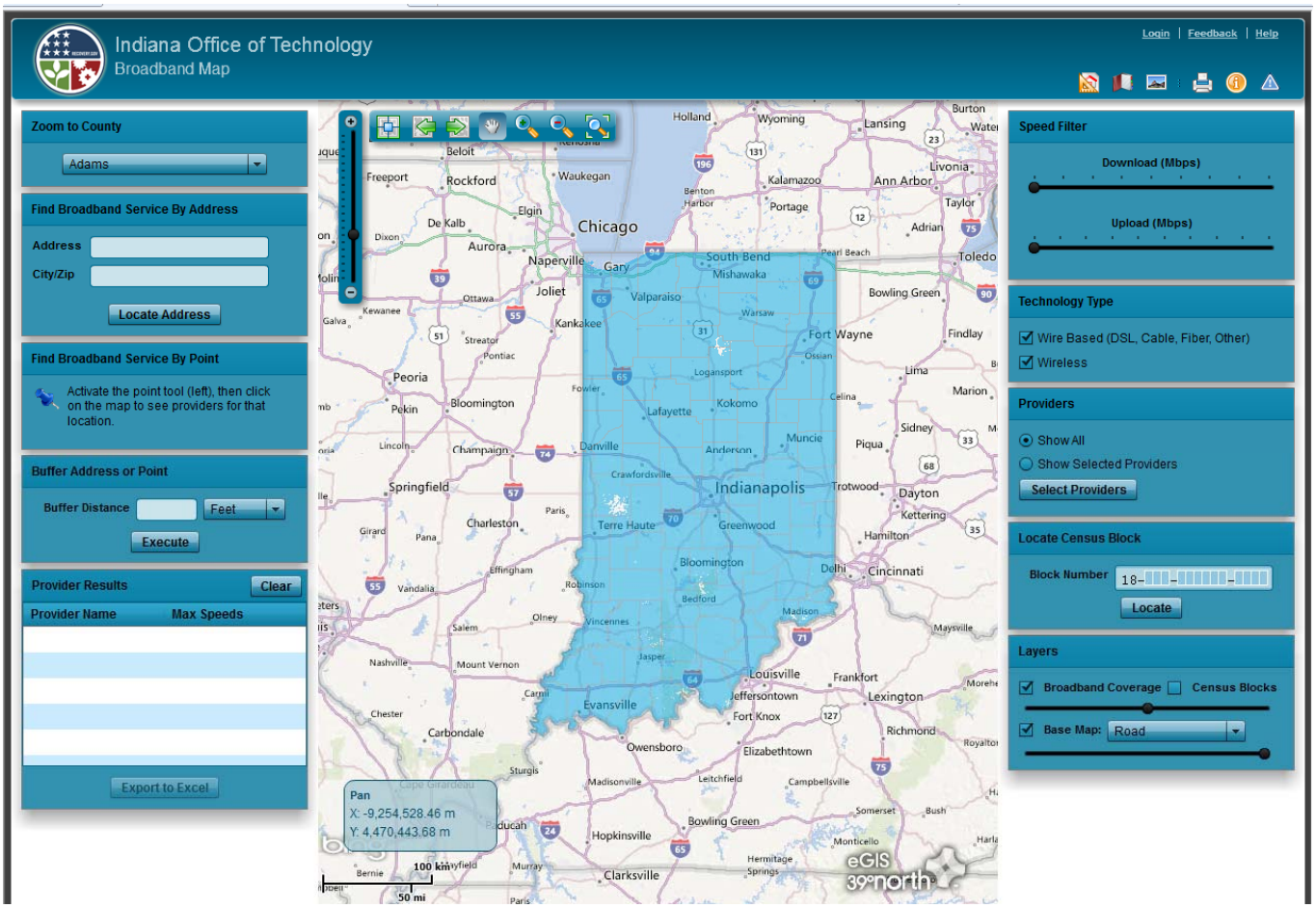

Address Level Data Collection

We continue to collect address level data. Indeed, as described above, Indiana is well on the way to creating address level reference data to facilitate the collection of address level broadband service availability, not just in census blocks larger than two square miles, but statewide. These data will be invaluable as the lowest common denominator to allow the construction of any geography in support of broadband map display and analysis. This expands the options for how to depict speed across multiple geographies, and facilitates the inquiry of service data at a given x,y.

We have 86 counties who are providing address data as a result of the BB map funding, with more signing up each week.

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We are a two-thirds of the way in our acquisition of new orthophotography imagery to serve as the foundation for all other geospatial data, including centerlines and address level data.

Here is a graphic showing our orthophotography flight schedule.

Community Anchor Institutions

We identified community anchor institutions by cross referencing a statewide land parcel dataset with a data set from the Indiana Local Government Finance office containing, among other information, institution name, location by address, and use category. The results of this analysis have been included in previous deliveries for records containing name, location, and category at a minimum. These data, however, did not have sufficient broadband service information. Therefore, we have engaged a third party to survey the institutions to complete the attributes defined in the NOFA for these institutions. This data is included in our submission.

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The Indiana Office of Technology engaged Infogroup to identify and contact all anchor institutions in the State of Indiana. The goal was to determine broadband service and internet service providers that meet the definitions of "broadband" as outlined in the broadband mapping Notice of Funds Availability. The definition is inclusive of two-way data transmission with advertised speeds of 768 kbps downstream and 200 kbps upstream.

Infogroup had the ability to identify state anchor institutions and developed a script designed to gather the information required to answer to the requirements of the NTIA.

There data compilation process telephone verified all businesses, including those identified as anchor institutes, to ensure the highest level of accuracy with business name, business type and contact information. After compiling the list, Infogroup prepared a script and software to assist in capturing the necessary information. They then begin the telephone survey and data collection process and created a report in the tab-delimited text file format of the required information. This survey included institution name, complete address, latitude/longitude, category of institution, broadband service, technology of transmission and advertised downstream/upstream service speed where they are collected in a tab-delimited text file.

Data Submission Report

Broadband Service Provider Data as of December 31, 2012

Report date: April 1, 2013

Submitted to:

National Telecommunications and Information Administration
United States Department of Commerce

Submitted by:

Kansas Statewide Broadband Initiative
State of Kansas Department of Commerce

and

Kansas Data Access & Support Center (DASC)

Table of Contents

Provider Outreach & Communication Activities

During the past several months, the Kansas Statewide Broadband Initiative (KSBI) team continued to develop relationships with broadband providers and stakeholders with a focus on improving the completeness and overall quality of the statewide database, and engagement in the discussion that surround the implementation and use of broadband technologies across the state.

In October, 2012, members of the KSBI team attended the Mid-America Telecom Showcase & Seminar (MATSS) conference in Kansas City, MO and presented a display booth showing the public and provider web mapping applications. The conference provided a great opportunity to engage with Kansas providers, answer questions regarding the broadband mapping program, and demonstrate the KSBI's web-based tools. Also in October, a presentation on the KSBI was given to the Kansas Corporation Commission's (KCC) Board of Director's and to the Topeka, KS Public Libraries.

In November, the Governor's Rural Opportunities Conference was held in Salina, KS. KSBI was a featured presenter and the team addressed a wide range of stakeholders, providing an overview of the program, an assessment of availability across the state and the key role broadband plays in fostering economic development.

In conjunction with the Governor's Rural Opportunities Conference, KSBI held another in a series of Broadband Service Provider Roundtables. These roundtable sessions have proven to be an effective way to maintain active engagement with and participation from the Kansas service provider community. The Salina roundtable was well attended and participants received an overview of state and national broadband mapping initiatives. This led to a healthy exchange of ideas about the future of broadband access in Kansas. The KSBI team also met with representatives from a couple of providers that previously had not participated in the initiative and gained their agreement to provide data for the current submission.

Interest and involvement of the Kansas legislature continues to increase, in part as a direct result of our efforts to raise awareness of the initiative and our program sustainability plan. A bi-cameral Interim Legislative Committee on Rural Broadband was formed during the previous legislative session. At the request of the committee, KSBI provided a detailed presentation to members and showcased the latest enhancements made to the interactive map. The information shared was very well received. During this all-day hearing, the committee heard testimony from several broadband service providers as well as from the Kansas Corporation Commission. Per the committee's request, we will provide more frequent updates on the interactive map, consider implementation of a training session for interested users, and report findings from ongoing broadband research.

The data collection plan for period ending December 31, 2012 was kicked off in January, 2013 with two data submission webinars which were offered to all Kansas broadband service providers as an opportunity for them to learn more about the data-collection process. During these webinars, providers were given an overview of the data collection plan, purpose and uses of the data, as well as a review of census block and road segment geography. The process of integrating provider data submissions into the NTIA data model was also discussed, along with a demonstration of the Service Provider Feedback & Verification Portal. The request for participation in the current data submission was distributed via email to all known providers during the first week of January, 2013. The email contained detailed information tailored to each provider, and an unique hyperlink to the provider portal allowing them to view their previous submission. In order to ensure maximum participation, an escalation strategy was developed to follow-up with providers that did not meet the initial data submission deadline.

April, 2013 Data Collection Summary

- As of this submission, there are 111 entities in Kansas that meet the NTIA SBI program definition of broadband service providers
- 104 of the 111 service providers submitted revised data or confirmed no changes to their previous submission during this reporting period:
    - 53 revised dataset processed for service providers
    - 49 providers confirmed to have no revisions to their prior submissions
    - 2 database updates interpreted via data harvested from provider websites (Zayo Group, & Zito Media)
- 6 service providers previously not included in our data submissions were added to the statewide geodatabase as a result of ongoing efforts to gain agreement to participate and/or new entrants to the Kansas market:
    - Cogent Communications
    - Google Fiber
    - Level3 Communications
    - SureWest
    - Valunet
    - Zayo Group
- 1 service provider declined participation
- 39 providers responded to the Data Submission Survey via the Provider Portal
- 17 providers participated in Data Submission webinars
- 14 providers participated in interactive data review sessions (web meetings)

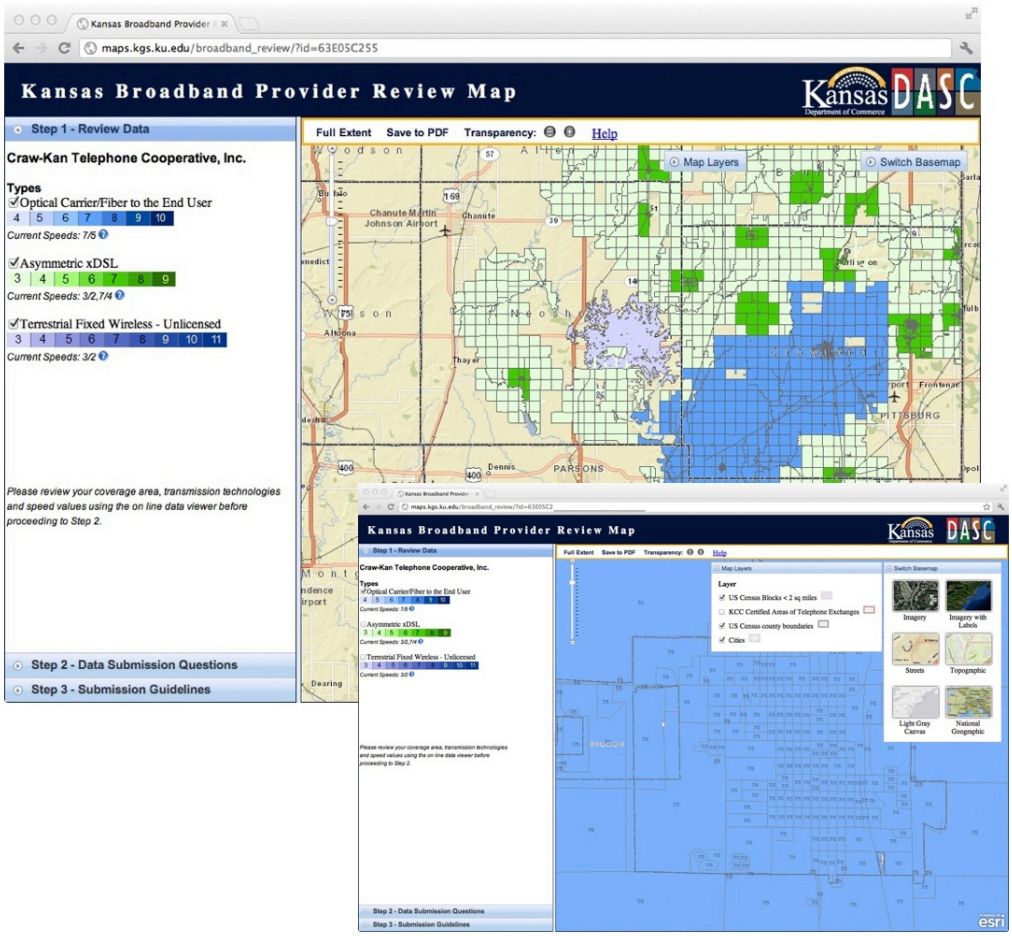
Service Provider Feedback & Verification Portal (provider portal)

The service provider portal was developed to offer an efficient and convenient way for providers to review their data and provide feedback to DASC. The portal includes three primary components:

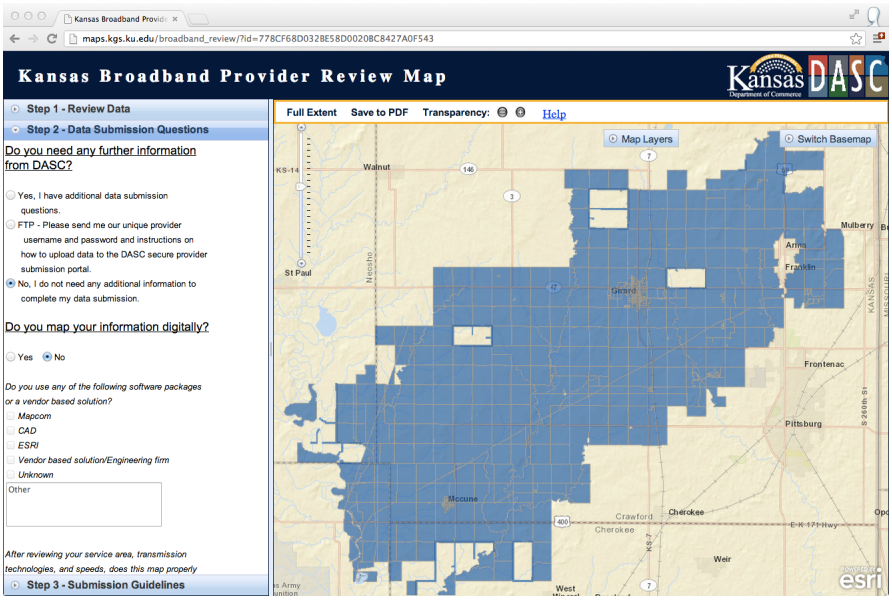
1. Interactive mapping application
2. Service provider survey form
3. Web site dashboard (for posting documents and announcements)

During the six-month reporting period, numerous changes to the portal were made, including enhancements to the 'provider survey' component. Version 2.0 of the portal was launched in January as part of the KSBI's data collection kickoff activities.

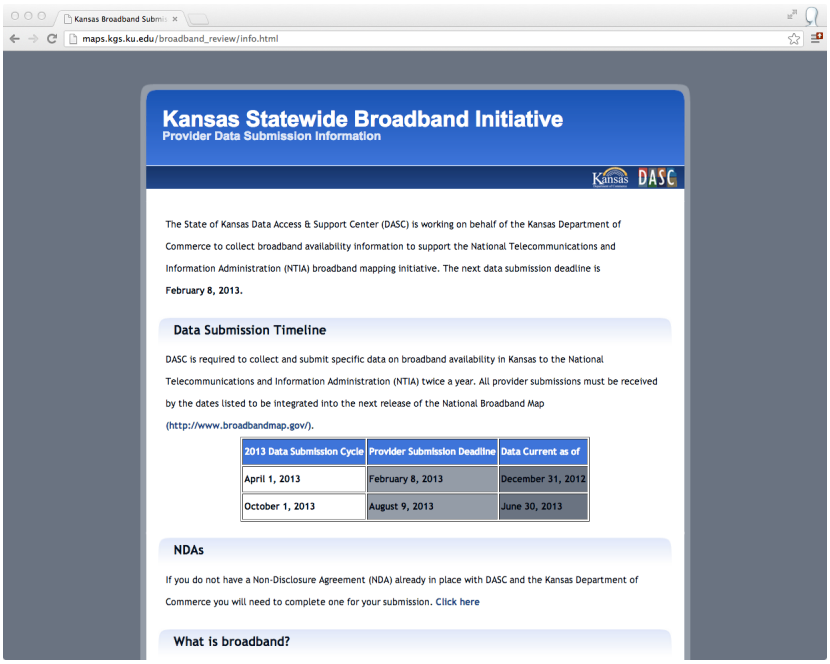
1. The interactive mapping component allows service providers to quickly view the data from their previous submission and determine if updates are needed. The map is rendered by transmission technology and speed. Each company received a unique URL that displays only their data, eliminating the need for usernames and passwords.



2. Survey component - each provider is asked to confirm or edit their Provider Name/FRN, contact information, and indicate whether they will be providing updates for the upcoming submission. Additional questions were added to the survey component for v2 (April, 2013 submission).



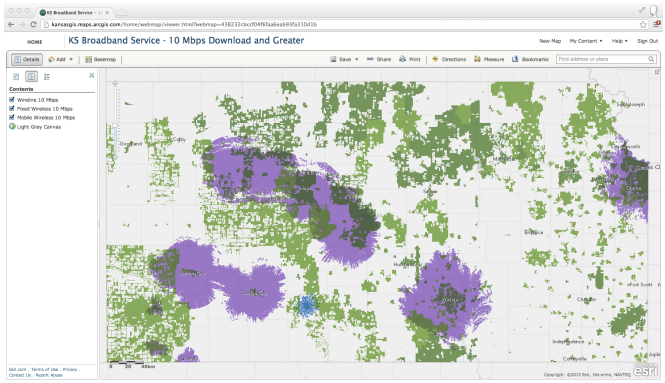
3. Web site - the provider web site includes information and documents about state and national broadband mapping initiatives, including data submission timelines, geodatabase standards and mapping techniques, and links to data submission spreadsheets. The web site is updated to reflect the current submission cycle.



Public Interactive Web-Mapping Application

The current version of the Kansas Interactive Broadband map provides stakeholders and the public in general, access to an extensive collection of information related to broadband coverage in the state. Users can view as a series of map displays and tools which allow easy generation of relevant broadband information, such as map by address, map by speed, map by technology, and map by provider. Additional functionality and refinements continue to be added, and plans are underway for a design refresh and integration with KSBI planning and economic development resources to give users a consolidated online destination to learn about Kansas broadband. Once these modifications are implemented, and user feedback is quantified into prioritized applications, the site will transition out of 'Beta' phase.

Additionally, a Kansas Broadband group was created on the State of Kansas ArcGIS Online enterprise account, and a series of thematic maps were published. These maps can easily be accessed using ArcGIS Desktop software or integrated into web mapping applications. The ArcGIS Online platform offers users and application developers another mechanism for leveraging this valuable database.

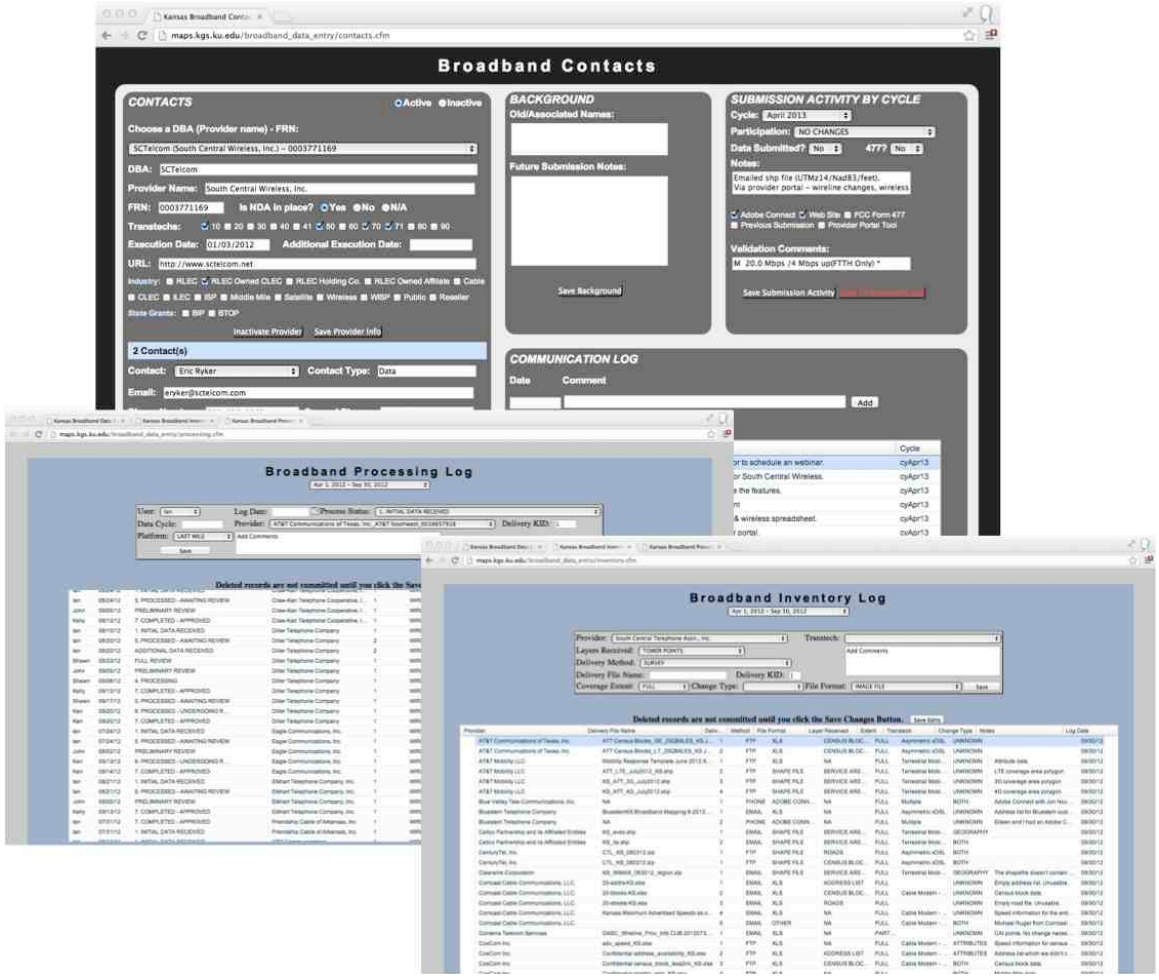


Broadband Content Management System

Over the past several months, DASC has completed the development of the Broadband Database Content Management System (CMS). As the project has evolved, numerous best practices have been developed and are being implemented. The CMS takes a patchwork of data tables and spreadsheets and produces a more comprehensive and useful system. The CMS features three primary components:

1. Contacts & Communications
2. Data Submission Log
3. Data Processing Log

An underlying relational database drives these components and contains information for all three submission made by the KSBI team. Additionally, an automated reporting tool has been developed to provide real-time status reports to improve management and planning for the initiative.



Data Processing & Validation

Information is collected from Kansas broadband service providers in a variety of formats including GIS data files, database tables and spreadsheets, CAD files, and paper maps. As files are received, they are reviewed to determine if they contain the required spatial and/or attribute information, and if there is a need for further communication with the provider. As necessary, DASC staff make follow-up phone calls, send emails, or hold Adobe Connect sessions in order to ensure that the information given by the provider is accurately reflected in the database.

All data submissions to the DASC office are processed according to the following steps:

1. Initial data review to determine quality and fitness for processing. Follow-up with broadband provider if necessary.
2. Creation of provider-specific "staging" geodatabase
3. Process edits according to information and materials submitted by provider
4. Review by editing technician
5. Quality Assurance/Quality Control (QA/QC) review
6. Integration into statewide geodatabase model

The following describes the general steps taken to integrate information provided in the various submission formats.

GIS Data (Shapefile/Geodatabase)
Service area descriptions submitted in a GIS data file format are loaded into a provider-specific staging geodatabase where they are used to determine their intersection with census block and road segment geometry. If a census block is smaller than two square miles, it is added to the *CensusBlock* feature class. If a census block is larger than two square miles, the corresponding road segments are added to the *RoadSegment* feature class. All required attribute information is then calculated for each feature class.

Database Tables/Spreadsheets/Text-file (Census Block ID/TIGER-Line ID)
It is common for providers to supply information regarding their service availability in a tabular format including a list of Census Block ID and/or TIGER-Line ID numbers. In these cases, the tabular data is joined to the Census geography to select *CensusBlock* and/or *RoadSegment* features. If a census block is larger than two square miles, the corresponding road segments are added to the *RoadSegment* feature class. Attribute items are then calculated for each feature class in the staging geodatabase.

Database Tables/Spreadsheets/Text-file (Address List)
In cases where service providers submit a table of customer addresses, this information is geocoded (sometimes referred to as address matching) to determine a location for each address in the table. This process results in a point data layer that is used to determine the corresponding census block and road segment assignment. If a point falls within a block that is smaller than two square miles, the block is added to the *CensusBlock* feature class. If a point falls within a block that is larger than two square miles, it is assigned to the nearest road segment and that feature is added to the *RoadSegment* feature class. Attribute items are then calculated for each feature class in the staging geodatabase.

CAD Files/Paper Maps
Some providers submit their service area descriptions as paper maps, PDF maps, or CAD drawings. In these cases, this information is interpreted to determine the intersection with census block and road segment geometry. Again, the two square mile threshold is observed for determining census block and road segment assignments, and the necessary attribute information is encoded into the database.

Wireless Service Area
Mobile wireless service providers supply a GIS data file (polygon feature class) describing their service area and characteristics. Service area polygon features are loaded into the provider-specific staging geodatabase and are processed into the NTIA geodatabase model. Fixed wireless service providers typically supply tower locations and characteristics in a standardized spreadsheet template. This information is used to calculate signal propagation models.

Middle Mile/Last Mile Infrastructure
Middle mile/last mile points are typically provided in either Shapefile or text-file format containing the necessary location and attribute information. During this submission cycle, some middle-mile infrastructure data was interpreted via data posted on provider web sites.

Community Anchor Institutions (CAI)
The CAI data was updated and enhanced through the integration of authoritative datasets from the Kansas Adjutant General's Department, which is the steward of the state's structures geodatabase including features such as schools (K-12 & Higher Education), Law Enforcement Buildings, Fire Stations, and EMS Stations. In addition to adding new features and refining existing locations, feature ID numbers were migrated from the structures database to the CAI layer where possible. Updates from these authoritative datasets will be incorporated into the CAI layer with each broadband data submission.

Data Review

In order to ensure that information supplied by the providers was correctly interpreted and incorporated into the database, DASC employs a variety of quality assurance methods and techniques.

1. Change detection - comparison of revised/updated boundary delineation or provider information with previous submissions. All service area updates are compared to the previous submission to determine if the change in geographic extent or attribute information is reasonable. While major revisions to a service area or technology may be accurate, appropriate follow-up measures are made with the provider to ensure that the submission materials have been provided and/or interpreted correctly. Between the October, 2012 and April, 2013 submission, an ArcGIS/Python script was developed to automate the comparison of current/previous provider submissions and generate both geographical representations and statistical summaries of wireline block loss and gain. While this change detection analysis has been part of KSBI's standard data review process, the automation of this process has helped to make the review more efficient and rigorous.

2. Conference calls – As necessary, follow-up phone calls were made to providers to resolve issues related to submission materials. While this process was time consuming, it was also viewed as part of the relationship building process. It helped to ensure that database edits followed the intent of the provider. Additionally, the GIS technical staff had the opportunity to provide additional background on how the data is collected, aggregated, and used.

3. Interactive Web meetings – using Adobe Connect, interactive desktop GIS sessions were held with 14 providers to verify service area definitions, transmission technology, and required edits. This was the most effective communication tool used in the data collection and editing phase of the project. DASC will continue to encourage providers to participate in these sessions. It is very efficient, allows both parties to see the map and discuss necessary edits, answer questions in real time, and most importantly, build a relationship that leads to continued participation.

Provider Web Site Research

Information including maximum advertised download and upload speed, transmission technology, and service area was harvested from provider web sites and stored in a database. This information was used as a cross-reference for the broadband geodatabase. Of the provider web sites researched, 83% contained speed information, 64% contained transmission technology, and 92% contained a location reference. Some provider web sites published a map of their service areas, while others simply listed the cities or regions that they served. The information posted to the provider web sites

serves as a valuable resource for validating the broadband geodatabase. DASC plans to refresh this information prior to each submission cycle.

Commercial Dataset Validation

The Esri Cable (MediaPrints) dataset contains boundaries for US cable systems, including areas designated as having high-speed Internet access. While the mapping methodologies and data resolutions are different between MediaPrints and the State Broadband Map (SBM), the MediaPrints dataset provides a good reference for cable technology-based service providers, and their service area. The process listed below was used to determine general agreement/disagreement between the two datasets. In cases where the spatial extent between providers agrees, the confidence value in the SBM is higher. In cases where the extent disagrees, it indicates a need for further research, and/or follow-up with the provider in question.

Cable Boundaries:

1. Filter MediaPrints dataset for 'Operates Internet = Y'.
2. Use SQL to match providers listed in the MediaPrints dataset to those contained in the SBM. Due to differences between provider names between the two datasets, this is a partially automated process.
3. Perform spatial intersect to locate areas of disagreement (for example, Internet service indicated by MediaPrints, and not by SBM).
4. Visually inspect areas of disagreement.
5. Flag areas of disagreement for follow-up research.

Fiber:

1. Query MediaPrints layer for FiberMiles > 0 and generate list of providers matching criteria.
2. Query SBM for TRANSTECH = 50 and generate list of providers matching criteria.
3. Compare lists to flag providers that have implemented fiber-based technology, but are not indicated as TRANSTECH = 50 (FTTH) in the SBM. While these providers may offer Hybrid-fiber Coaxial service, and not true FTTH, it does indicate a need for follow-up research for clarification.

The analysis performed shows strong agreement between both identified service providers and corresponding service areas. Further research and outreach will be conducted to resolve differences between the two datasets. The MediaPrints license agreement provides quarterly updates; therefore, the validation procedures described above will also be performed on a quarterly basis.

Future Direction

During the coming months the KSBI team will focus on ensuring that, as the project enters its final year under the grant, we are able to demonstrate the value of the data collection, the strength of service provider outreach in expanding coverage with accurate mapping applications, and integrating the data with planning and economic development efforts.

Service provider outreach and coordination activities:

- Broadband Service Provider Roundtables – additional roundtables will be scheduled based on provider feedback and coordination with other broadband planning activities.
- Data Submission Webinars – these valuable sessions will be continued as an efficient way to review data requirements, discuss technical issues, and answer service provider questions regarding the data-collection process.
- Provider feedback package - upon acceptance of the April, 2013 data submission by the NTIA, the revised data will be made accessible via the interactive mapping component of the provider portal.

Enhancements to KSBI interactive web resources:

This will include a significant refresh of the online web presence for KSBI, integrating key planning and capacity building elements with coverage maps. Plans call for developing pre-populated interactive maps of those most commonly requested by key stakeholders, development and publication of custom static maps to illustrate unique attributes of the Kansas broadband landscape, such as needed in support of Regional Technology Planning teams.

Other enhancements include:

- Integration of April, 2013 data submission (data current as of December 31, 2012) into Public web mapping application
- Publication of Broadband Atlas - lightweight, interactive maps, based on ArcGIS Online technology
- Integration of verification results into content management system
- Creation of additional automated reporting tools for broadband stakeholders.

CAI data enhancements:

- Refresh CAI layer with structures database updates from state database stewards.
- Update CAI attribute table with information collected during the recently conducted study - *Building the Broadband Future: The Communications Needs of Kansas Schools, Libraries, and Hospitals*
- Coordinate with other State agencies in support of anticipated initiation of Public Safety Broadband State Local Implementation Grant Program in conjunction with the FirstNet program.

Verification and validation activities:

- Commercial dataset validation activities including Esri Cable (MediaPrints) and American Roamer databases
- Maintain provider web site harvesting activity
- Comparison of consumer speed test results against current broadband geodatabase
- Develop mobile wireless verification plan

Appendix A – Service Provider Status Table

Provider	DBA Name	FRN	NDA	State Database Status	Reporting Period Status
AT&T Mobility LLC	AT&T Mobility LLC	4979233	Yes	Data Included in KS State Submission	Updates included this reporting period
AT&T Communications of Texas, Inc.	AT&T Southwest	16657918	Yes	Data Included in KS State Submission	Updates included this reporting period
TC Wireless, Inc.	Advantage Plus	18587469	Yes	Data Included in KS State Submission	No updates this reporting period
Allegiance Communications, LLC	Allegiance CATV	10267862	No	Data Included in KS State Submission	Updates included this reporting period
Atwood Cable Systems, Inc.	Atwood Cable Systems, Inc.	3789765	No	Data Included in KS State Submission	No updates this reporting period
Benkelman Telephone Company	BWTelcom	2387264	Yes	Data Included in KS State Submission	Updates included this reporting period
Hartman Telephone Exchanges	BWTelcom	4329348	No	Data Included in KS State Submission	Updates included this reporting period
Blue Valley Tele-Communications, Inc.	Blue Valley Tele-Communications, Inc.	2331262	Yes	Data Included in KS State Submission	No updates this reporting period
Haug Communications, Inc.	BroadBand Wireless Internet	5600242	Yes	Data Included in KS State Submission	No updates this reporting period
Benson Tel Service Inc.	Btsskynet.net	18562207	No	Data Included in KS State Submission	No updates this reporting period
Cable ONE	Cable ONE	3474327	Yes	Data Included in KS State Submission	Updates included this reporting period
CenturyTel, Inc.	CenturyLink	18626853	Yes	Data Included in KS State Submission	Updates included this reporting period
City of Chanute	City of Chanute	2295400	Yes	Data Included in KS State Submission	No updates this reporting period
City of Coffeyville	City of Coffeyville	18535427	No	Data Included in KS State Submission	No response to recent data request
Clearwire Corporation	Clear	17775628	NA	Data Included in KS State Submission	Updates included this reporting period
Cogent Communications, Inc.	Cogent Communications, Inc.	19066034	No	Data Included in KS State Submission	Updates included this reporting period
Columbus Telephone Company	Columbus Telephone Company	3734167	Yes	Data Included in KS State Submission	No updates this reporting period
Comcast Cable Communications, LLC	Comcast	4441663	Yes	Data Included in KS State Submission	Updates included this reporting period
CoxCom Inc.	Cox Communications	1524461	Yes	Data Included in KS State Submission	No updates this reporting period
Craw-Kan Telephone Cooperative, Inc.	Craw-Kan Telephone Cooperative, Inc.	2334225	Yes	Data Included in KS State Submission	No updates this reporting period
Leap Wireless International, Inc.	Cricket Communications, Inc.	2963528	Yes	Data Included in KS State Submission	Updates included this reporting period
Cunningham Communications, Inc.	Cunningham Telephone & Cable	4985818	Yes	Data Included in KS State Submission	No updates this reporting period
Diller Telephone Company	Diller Telephone Company	2393379	Yes	Data Included in KS State Submission	No updates this reporting period
Diller Telephone Company	Diode Communications	2393379	No	Data Included in KS State Submission	Updates included this reporting period
Eagle Communications, Inc.	Eagle Communications, Inc.	13339973	Yes	Data Included in KS State Submission	No updates this reporting period
Elkhart Telephone Company, Inc.	Epic Touch Company, Inc.	2330843	Yes	Data Included in KS State Submission	No updates this reporting period
Bluestem Telephone Company	FairPoint Communications	3723491	Yes	Data Included in KS State Submission	Updates included this reporting period
FairPoint Missouri, Inc.	FairPoint Communications	14710388	Yes	Data Included in KS State Submission	Updates included this reporting period
Rural Link	FairPoint Communications	14710388	Yes	Data Included in KS State Submission	No updates this reporting period

Provider	DBA Name	FRN	NDA	State Database Status	Reporting Period Status
Sunflower Telephone Co., Inc.	FairPoint Communications	3723236	Yes	Data Included in KS State Submission	Updates included this reporting period
WISP-Router, Inc	Family Entertainment Network	16099509	Yes	Data Included in KS State Submission	No updates this reporting period
GBT Communications	GBT Communications	12141842	No	Data Included in KS State Submission	No updates this reporting period
Giant Communications, Inc.	Giant Communications	8830846	No	Data Included in KS State Submission	Updates included this reporting period
Google Fiber Kansas LLC	Google Fiber Kansas LLC	22427892	No	Data Included in KS State Submission	Updates included this reporting period
Gorham Telephone Company, Inc.	Gorham Telephone Company	4322889	Yes	Data Included in KS State Submission	No updates this reporting period
H&B Cable Service, Inc.	H&B Communications, Inc.	2331601	Yes	Data Included in KS State Submission	Updates included this reporting period
Haviland Telephone Company, Inc.	Haviland Telephone Company, Inc.	5081567	Yes	Data Included in KS State Submission	Updates included this reporting period
Home Communications, Inc.	Home Telephone Company, Inc.	10627446	Yes	Data Included in KS State Submission	No updates this reporting period
Hughes Network Systems, LLC	Hughes Network Systems, LLC	17434911	No	Data Included in KS State Submission	Updates included this reporting period
JBN Telephone Company, Inc.	JBN Telephone Company, Inc.	4340410	No	Data Included in KS State Submission	Updates included this reporting period
Kansas Data Internet, Inc.	KASINET	9999	No	Data Included in KS State Submission	No updates this reporting period
KanOkla Communications, Inc.	KanOkla Networks	2323731	Yes	Data Included in KS State Submission	Updates included this reporting period
The KanOkla Telephone Association, Inc.	KanOkla Networks	4362364	Yes	Data Included in KS State Submission	No updates this reporting period
Kansas Broadband Internet, Inc.	Kansas Broadband Internet, Inc.	16893455	Yes	Data Included in KS State Submission	No updates this reporting period
Kansas Fiber Network, LLC	Kansas Fiber Network, LLC	19529569	No	Will Provide Data	Data expected next reporting period
Knology of Kansas, Inc.	Knology of Kansas, Inc.	20113197	Yes	Data Included in KS State Submission	No updates this reporting period
LaHarpe Telephone Company, Inc.	LaHarpe Telephone Company, Inc.	4322053	No	Data Included in KS State Submission	No updates this reporting period
Lawrence Freenet	Lawrence Freenet	14524193	No	Data Included in KS State Submission	Will Not Provide Data
Level 3 Communications, LLC	Level 3 Communications, LLC	3227238	No	Data Included in KS State Submission	Updates included this reporting period
Mediacom	MCC Missouri LLC	5184247	Yes	Data Included in KS State Submission	Updates included this reporting period
Madison Telephone LLC	Madison Telephone LLC	4322079	No	Data Included in KS State Submission	Updates included this reporting period
MegaPath Corporation	MegaPath Corporation	3753787	Yes	Data Included in KS State Submission	Updates included this reporting period
Mercury Wireless, LLC	Mercury Wireless, LLC	18603027	Yes	Data Included in KS State Submission	Updates included this reporting period
St. Joe Wireless	Midwest Mobile Radio Service, Inc.	2545929	Yes	Data Included in KS State Submission	No updates this reporting period
Moundridge Telephone Company, Inc.	Moundridge Telephone Company, Inc.	2339976	Yes	Data Included in KS State Submission	No updates this reporting period
LR Communications, Inc.	Mutual Telecommunications	14024640	Yes	Data Included in KS State Submission	Updates included this reporting period
North Central Kansas Community Network	NCKCN	9999	Yes	Data Included in KS State Submission	No updates this reporting period
Nautilus Net	Nautilus Net	9999	No	Data Included in KS State Submission	No updates this reporting period
Nex-Tech, Inc.	Nex-Tech, Inc.	17125808	Yes	Data Included in KS State Submission	Updates included this reporting period

Provider	DBA Name	FRN	NDA	State Database Status	Reporting Period Status
PAETEC Communications, Inc.	PAETEC Communications, Inc.	3744869	No	Non-Responsive	No response to recent data request
Peoples Telecommunications, LLC	Peoples Telecommunications, LLC	4310694	Yes	Data Included in KS State Submission	Updates included this reporting period
Pioneer Telephone Association, Inc.	Pioneer Communications	2334795	Yes	Data Included in KS State Submission	No updates this reporting period
Pixius Communications LLC	Pixius Communications	19389949	No	Data Included in KS State Submission	No response to recent data request
Carson Communications	Rainbow Communications	13722	Yes	Data Included in KS State Submission	Updates included this reporting period
Rainbow Telecommunications Association, Inc.	Rainbow Communications	2333649	Yes	Data Included in KS State Submission	Updates included this reporting period
Rebeltec Communications LLC	Rebeltec Communications LLC	16084675	Yes	Data Included in KS State Submission	No updates this reporting period
Nex-Tech, Inc.	Rural Telephone	6192041	Yes	Data Included in KS State Submission	No updates this reporting period
Rural Telephone Service Company, Inc.	Rural Telephone	2336105	Yes	Data Included in KS State Submission	No updates this reporting period
S&A Telephone Company, Inc.	S&A Telephone Company, Inc.	2329662	Yes	Data Included in KS State Submission	No updates this reporting period
S&T Communications LLC	S&T Communications LLC	8460081	Yes	Data Included in KS State Submission	Updates included this reporting period
S&T Telephone Cooperative Association, Inc.	S&T Telephone Cooperative Association, Inc.	4310769	Yes	Data Included in KS State Submission	Updates included this reporting period
South Central Telephone Assn., Inc.	SCTelcom	3771235	Yes	Data Included in KS State Submission	Updates included this reporting period
South Central Wireless, Inc.	SCTelcom	3771169	Yes	Data Included in KS State Submission	No updates this reporting period
Skycasters	Skycasters	18756155	Yes	Data Included in KS State Submission	No updates this reporting period
SWKO, Inc.	SouthWest Kansas Online	20608121	No	Data Included in KS State Submission	No response to recent data request
Southeast Nebraska Communications, Inc.	Southeast Nebraska Telephone Company	6764948	Yes	Data Included in KS State Submission	Updates included this reporting period
Southern Kansas Telephone Company, Inc.	Southern Kansas Telephone Company, Inc.	2333888	Yes	Data Included in KS State Submission	Updates included this reporting period
KeyOn Communications, Inc.	SpeedNet	15082621	No	Data Included in KS State Submission	No updates this reporting period
Sprint Nextel Corporation	Sprint	3774593	Yes	Data Included in KS State Submission	Updates included this reporting period
Spacenet, Inc.	Starband Communications, Inc.	5087457	No	Data Included in KS State Submission	No updates this reporting period
Stelera Wireless, LLC	Stelera Broadband	15021066	No	Data Included in KS State Submission	No updates this reporting period
Stouffer Communications, Inc.	Stouffer Communications	6716666	No	Data Included in KS State Submission	Updates included this reporting period
Friendship Cable of Arkansas, Inc.	Suddenlink Communications	4999025	Yes	Data Included in KS State Submission	No updates this reporting period
NPG Cable, LLC	Suddenlink Communications	200399200	Yes	Data Included in KS State Submission	No updates this reporting period
W.K. Communications, Inc.	Suddenlink Communications	4999736	Yes	Data Included in KS State Submission	Updates included this reporting period
Sumner Cable TV, Inc.	Sumner Communications	7631187	Yes	Data Included in KS State Submission	Updates included this reporting period
SureWest Kansas Operations, LLC	SureWest Kansas Operations, LLC	143027194	Yes	Data Included in KS State Submission	Updates included this reporting period
SwiftLink 4 State Wireless Internet LLC	SwiftLink 4 State	22218556	No	Data Included in KS State Submission	Updates included this reporting period

Provider	DBA Name	FRN	NDA	State Database Status	Reporting Period Status
T-Mobile USA, Inc.	T-Mobile	6945950	Yes	Data Included in KS State Submission	Updates included this reporting period
The Tri-County Telephone Association	The Tri-County Telephone Association	1630433	Yes	Data Included in KS State Submission	No updates this reporting period
Time Warner Cable LLC	Time Warner Cable	7556251	Yes	Data Included in KS State Submission	Updates included this reporting period
Totah Communications, Inc.	Totah Communications, Inc.	5010996	Yes	Data Included in KS State Submission	No updates this reporting period
Mokan Dial, Inc.	Townes Telecommunications Services Company	4928750	Yes	Data Included in KS State Submission	No updates this reporting period
Twin Valley Communications, Inc.	Twin Valley Communications, Inc.	10059640	Yes	Data Included in KS State Submission	No updates this reporting period
Twin Valley Telephone, Inc.	Twin Valley Telephone, Inc.	2334407	Yes	Data Included in KS State Submission	No updates this reporting period
Twinmounds.com	Twinmounds.com	18333211	No	Data Included in KS State Submission	No updates this reporting period
United States Cellular Corporation	U.S. Cellular	4372322	Yes	Data Included in KS State Submission	No updates this reporting period
United Communications Association, Inc.	United Communications Association	2327153	Yes	Data Included in KS State Submission	Updates included this reporting period
United Wireless Communications, Inc.	United Wireless	12662698	Yes	Data Included in KS State Submission	Updates included this reporting period
Valnet	Valnet	18198572	Yes	Data Included in KS State Submission	No updates this reporting period
Valunet	Valunet	9999	No	Data Included in KS State Submission	Updates included this reporting period
Cellco Partnership and its Affiliated Entities	Verizon Wireless	3290673	Yes	Data Included in KS State Submission	Updates included this reporting period
ViaSat, Inc.	ViaSat Communications, Inc.	7843766	No	Data Included in KS State Submission	No updates this reporting period
Wamego Telecommunications Company, Inc.	Wamego Telecommunications Company, Inc.	3746088	Yes	Data Included in KS State Submission	No updates this reporting period
Wave Wireless LLC	Wave Wireless LLC	18057257	No	Data Included in KS State Submission	No response to recent data request
Wheat State Telephone, Inc.	Wheat State Telephone, Inc.	2333672	No	Data Included in KS State Submission	Updates included this reporting period
Wheatland Broadband Services	Wheatland Broadband	6121354	Yes	Data Included in KS State Submission	Updates included this reporting period
Ideatek Systems Inc.	Wildflower Internet	16098857	Yes	Data Included in KS State Submission	Updates included this reporting period
Wilson Telephone Company, Inc.	Wilson Telephone Company, Inc.	3722444	Yes	Data Included in KS State Submission	Updates included this reporting period
Zayo Group, LLC	Zayo Group, LLC	19133826	No	Data Included in KS State Submission	Updates included this reporting period
Zito Midwest, LLC	Zito Media	20111225	No	Data Included in KS State Submission	Updates included this reporting period

DATA DEVELOPMENT & VALIDATION METHODOLOGIES WHITE PAPER

Commonwealth of Kentucky
State Broadband Initiative (SBI)
Broadband Mapping Project

COMMONWEALTH OFFICE
OF BROADBAND OUTREACH
AND DEVELOPMENT
Promoting a 21st century economy

NTIA Data Submittal
April 1, 2013

Baker

Table of Contents

Table of Figures

Appendices

Introduction

The following sections of this document provide an overview of the process used for the SBI Broadband Mapping data development for the Commonwealth of Kentucky. The following narrative is depicted in Appendix A, Commonwealth of Kentucky SBI Process Workflow, and Appendix B, State Broadband Data Validation Workflow, included at the end of this document.

Broadband Provider Outreach Results

As a result of the outreach to broadband providers and investigating whether an internet service provider (ISP) meets the definition of a broadband provider as per the NOFA, the following is a summary of our findings:

- 219 Total Investigated ISPs
- 116 Total Confirmed Broadband Service Providers (unique Provider/DBA combinations)
- 107 Broadband Service Providers who Supplied Data (unique Provider/DBA combinations)
- 6 Total Confirmed Broadband Service Resellers (unique Provider/DBA combinations)
- 3 Broadband Service Resellers who Supplied Data (unique Provider/DBA combinations)

Attachment C, Master Outreach List, contains additional provider information.

Broadband Provider Outreach Procedure

The following outreach procedure provides the framework for communicating with Broadband Service Providers (Providers). The primary goals of the outreach approach documented herein are to:

- Promote Provider understanding and acceptance of the Broadband Mapping process, results and benefits
- Clarify NTIA Broadband Mapping requirements
- Facilitate data confidentiality agreements as required
- Minimize the submittal of invalid data
- Enhance provider understanding of the semi-annual update process
- Work with Providers to evaluate submittal options to facilitate data submittals

Data Submission Guidelines

Guidelines for the providers' submission of Broadband Mapping Data are documented in the "Data Submission Guidelines". These Guidelines define technical requirements, submission specifications, and coordination and documentation activities.

Kentucky Broadband Providers Website

A URL was deployed (http://www.bakergis.com/kyBroadbandProvider/) to communicate and distribute NTIA NOFA requirements to providers along with outreach and data submittal materials including:

- NTIA NOFA and subsequent clarification
- Outreach letters to providers
- Non-Disclosure Agreement
- Quick Start Guides

- Data Submission Guidelines
- Data Transmittal Letter
- Broadband Data Submittal Templates
- Census TIGER Data
- Data Submittal Assistance Contact Information

Outreach Delivery Vehicles

- A State Broadband Mapping Initiative Call for Data letter from the Kentucky Commonwealth Office of Technology (COT) was emailed to all Broadband Service Providers in the Commonwealth. This initial provider contact letter described the program and the role of Michael baker Jr., Inc. (Baker) acting on behalf of the COT for Broadband Data Collection and Mapping.
- Baker distributed a follow-up letter to all Providers describing the data submittal requirements and material and help available to aid with the data submittals.
- Submittal assistance was provided to providers that needed help with data submittals.
- Presentations were conducted with various broadband provider associations to present the data submittal requirements and answer questions.
- Email communication and electronic transfer of data was encouraged to facilitate a faster delivery of data and information.
- A URL was deployed and promoted to distribute outreach material and information concerning the Broadband Mapping Project.
- A secure FTP URL was provided for submittal of broadband data by providers.
- A secure Broadband Provider Data Update Webportal was deployed for providers to redline/update their service coverage, rather than supply their updated coverage for the semi-annual data updates.

Inclusion of Resellers

With the request for data current as of December 31, 2011, resellers are being included in all of the outreach, data collection, data aggregation, and verification tasks. The following outreach form has been developed to secure the proper information and to minimize the resource commitment required by the reseller.

BROADBAND SERVICE PROVIDER INFORMATION ****Please fill out one form per DBA and / or Technology of Transmission****					
Provider Name:					
Doing Business As (DBA) Name (if applicable):					
FCC Registration Number (FRN) (if applicable):					
Website Address:					
Do you own transmission equipment, including middle mile, for your service area or for any part? *(Termed 'Broadband Primary Provider' in FAQ's)*	☐	Yes	☐	No	
If you answered Yes, please indicate this coverage area by county, municipality, or zip code and a map will be provided for you to further define your coverage area.					
If you answered No, please indicate the Carriers you contract with to provide your company's broadband coverage. *(Termed 'Broadband Reseller' in FAQ's)*					
Do you resell broadband services for the entire area of each carrier above?	☐	Yes	☐	No	
If No, then please indicate your reseller coverage area(s) by county, municipality, or zip codes and a map will be provided for you to further define your reseller coverage area:					
Technology of Transmission: *(one per form)*					
☐	Asymmetric xDSL (ADSL)	☐	Symmetric xDSL (SDSL)		
☐	Cable Modem - DOCSIS 3.0	☐	Other Copper Wireline		
☐	Cable Modem - Other	☐	Optical Carrier / Fiber to the End User		
☐	Terrestrial Fixed Wireless - Unlicensed	☐	Terrestrial Fixed Wireless - Licensed		
☐	Terrestrial Mobile Wireless	☐	Electric Power Line		
☐	Satellite	☐	Other		
Speed Tiers: *What is the **Maximum** Broadband advertised speed ?*					
Maximum Advertised Downstream Speed	☐	Greater than 768 kbps and less than 1.5 mbps			
	☐	Greater than 1.5 mbps and less than 3 mbps			
	☐	Greater than 3 mbps and less than 6 mbps			
	☐	Greater than 6 mbps and less than 10 mbps			
	☐	Greater than 10 mbps and less than 25 mbps			
	☐	Greater than 25 mbps and less than 50 mbps			
	☐	Greater than 50 mbps and less than 100 mbps			
	☐	Greater than 100 mbps and less than 1 gbps			
	☐	Greater than or equal to 1 gbps			
Maximum Advertised Upstream Speed	☐	Less than or equal to 200 kbps			
	☐	Greater than 200 kbps and less than 768 kbps			
	☐	Greater than 768 kbps and less than 1.5 mbps			
	☐	Greater than 1.5 mbps and less than 3 mbps			
	☐	Greater than 3 mbps and less than 6 mbps			
	☐	Greater than 6 mbps and less than 10 mbps			
	☐	Greater than 10 mbps and less than 25 mbps			
	☐	Greater than 25 mbps and less than 50 mbps			
	☐	Greater than 50 mbps and less than 100 mbps			
	☐	Greater than 100 mbps and less than 1 gbps			
	☐	Greater than or equal to 1 gbps			

Figure 1 Reseller Outreach/Interview Form

Secure Broadband Provider Data Update Webportal

A secure web-based application for broadband service providers has been deployed to simplify and automate the semi-annual process for collecting and verifying data. The webportal provides an easy-to-use map redlining tool for updating a provider broadband service area and attributes. It is expected that the simplification and automation of the data collection process will increase participation and improve the timeliness of provider response, data accuracy and consistency. Providers are being encouraged to utilize this tool but data is still being accepted through other means and formats.

Figure 2 Provider Data Update Webportal Entry Page

The View/Edit Coverage Map functions via secure login/password and secured map services limit broadband providers to see and edit only their own data. Picklists of valid database attributes eliminate entry errors and create consistency. It also contains a workflow from initial provider input, saving of a provider's work-in-progress, provider formally submitting edits, aggregation into the master geodatabase, soliciting provider approval of aggregated data, and final approval of the edit.

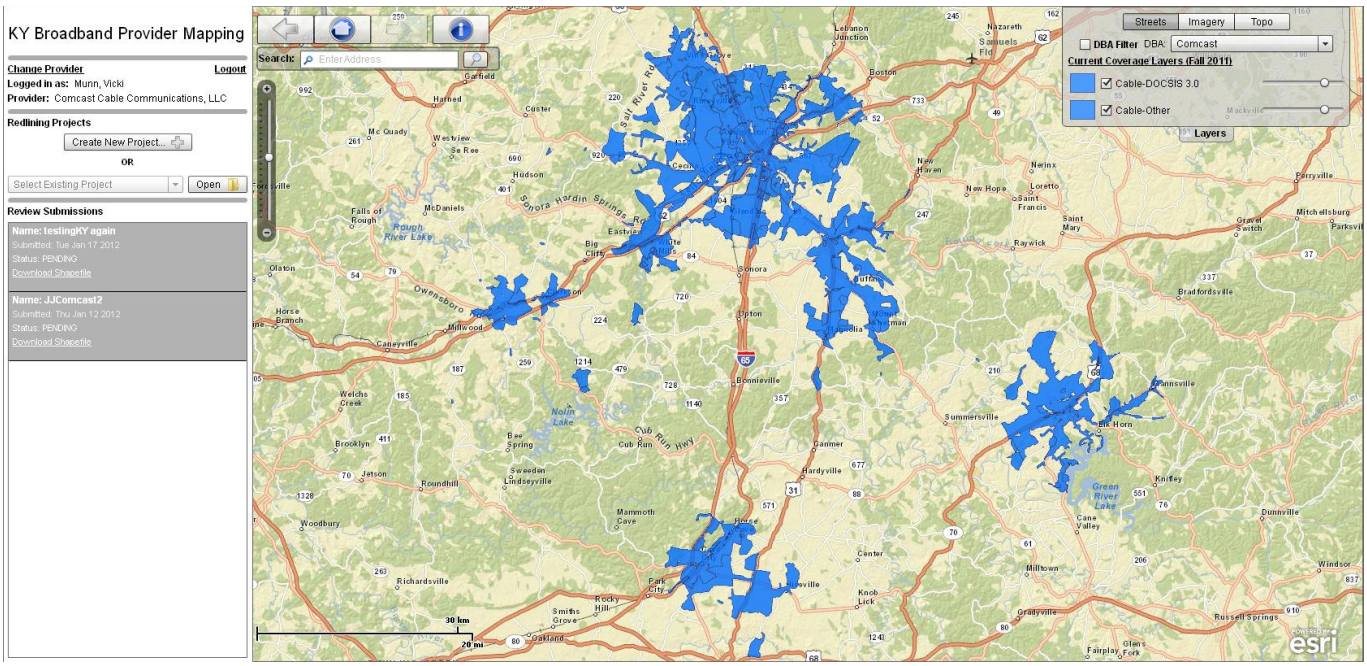


Figure 3 Provider Data Update Webportal –View/Edit Coverage Map Environment

Broadband Outreach Tracker

The Tracker application (

Figure 4) is utilized to collect all correspondence with Providers and feedback on the effectiveness of the outreach activities by tracking items such as:

- The number and content of incoming e-mails and letters submitted from the Providers
- The number and source of comments, questions, and suggestions made by Providers
- The number and source of comments, questions, and suggestions made by attendees at Provider meetings and conference calls
- Provider contact information and data submittal status.

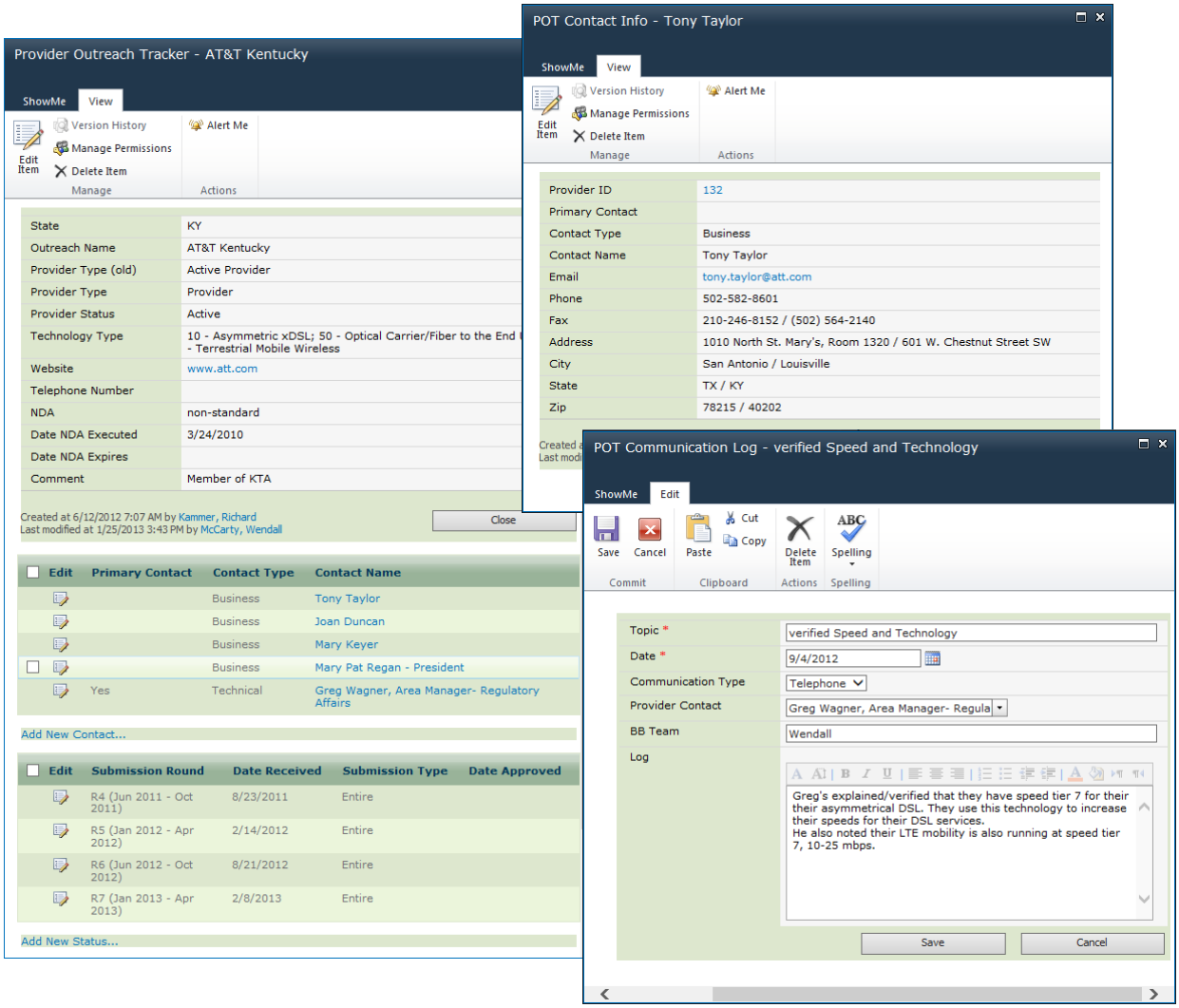


Figure 4 Broadband Outreach Tracker

Provider Submittal Validation

When a data submittal is received from a broadband service provider it is updated in the Broadband Outreach Tracker and run through an initial validation process to assure that it meets the submittal guidelines.

Validation Checklist

The following items are part of this initial data validation process:

- Verify the provider Transmittal Letter is complete and matches submitted data
- Verify the file naming conventions
- Verify each file is machine readable
- Verify data is in the correct GIS or Tabular format/file type
- Verify each field is populated and no empty or NULL values are present for mandatory fields

- Verify all ID (record number points) are unique within the submittal
- Verify all attribute data is formatted according to the submittal guidelines
- Verify topology for all geospatial submissions
- Verify Metadata for all submissions
- Verify the required contact information is included
- Verify adherence to Data Submittal Guidelines (see http://www.bakergis.com/kyBroadbandProvider/ to access Data Submittal Guidelines)
  Broadband Service Availability (at least one)
  - Individual Street Addresses (Sec 3.1 & 4.1)
  - Census Blocks < 2 sq mi (3.3 & 4.3)
  - Street Segments for Census Blocks > 2 sq mi (3.2 & 4.2)
  - Service Overview (Sec 3.4 & 4.4)
  - Polygonal Boundary Area(s) (Sec 3.8 & 4.8)

  Middle-mile Points (Sec 3.5 & 4.5)
  Community Anchor Institutions (Sec 3.7 & 4.7)
  Last Mile Connection Points (Sec 3.6 & 4.6)
  WISP Antennas (Sec 4.9)

Data Usability Determination

The validation results are evaluated by the outreach and aggregation persons to determine the usability of the data. If the data meets the submission specifications, it is forwarded on for data aggregation. If it is determined to be unusable, it is returned to the provider for resolution. If the data can be manipulated to get it into a usable format, it is manipulated as required, and then forwarded on for data aggregation.

SBI Data Development

Data from the providers may be submitted in various formats as defined in the Data Submittal Guidelines, or in some cases unspecified formats may be accepted to help facilitate provider participation. Depending on the format of the submitted data, it is processed through one of the following processes to upgrade it to the NTIA SBI data standards.

Spatial Data

After validation and any required manipulation of any spatial data submitted by the providers, it is georeferenced and simply loaded into the appropriate NTIA geodatabase feature class.

Address Data Geocoding

If not already in the standard address point template, the provider tabular address data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. ArcGIS geocoding tools are then utilized geospatially locate the address points for the tabular records. Interactive address rematching is performed against two additional street centerline datasets as needed to increase geocoding matching results. The NTIA deliverable is the geocoded address point geodatabase table. The geocoded address points are also subsequently aggregated to the census block or road segment feature class for public web map display.

Census Block Aggregation

If not already in the standard census block template, the provider tabular census block data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. The provider tabular census block records are then joined to the geodatabase 2010 U.S. Census Block. This join is performed as many times as necessary for multiple Trans Tech values for each Provider/Census Block combination. The NTIA deliverable is the census block geodatabase table.

If the list of census blocks contains blocks > 2 sq. miles then these blocks are used to select all the 2010 U.S. Census TIGER centerlines that intersect those blocks. The Census Block record data is aggregated to each Road Segment within the Census Block. This process is performed as many times as necessary for multiple Trans Tech values for each Provider/Census Block combination.

Road Segment Aggregation

If not already in the standard road segment template, the provider road segment data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. If the provider submittal included graphic centerline segments, these are migrated into the delivery geodatabase along with the linked attribute records. If the provider submittal was tabular road segment records only, they are then joined to the geodatabase 2010 U.S. Census TIGER centerline feature class. This join is performed as many times as necessary for multiple Trans Tech values for each Provider/Road Segment combination. The NTIA deliverable is the road segment geodatabase table.

If the provider road segment data lie within census blocks <= 2 sq. miles then the road segment data is aggregated to the census block. This process is performed as many times as necessary for multiple Trans Tech values for each Provider/Road Segment combination. The NTIA deliverable is the road segment geodatabase table.

Overview Data Aggregation

Provider Service Availability Areas submitted for entire county areas are loaded into the NTIA geodatabase Overview table. If not already in the standard template, the provider data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. The Provider Overview records are then joined to the geodatabase 2010 U.S. Census County feature class. This join is performed as many times as necessary for multiple Trans Tech values for each Provider/County Area combination.

Polygonal Boundary Aggregation/Integration

Providers submitting polygonal service area data are handled in two ways. Wireline Provider data is aggregated to the census block feature class for areas where census blocks <= 2 sq. mi., or road segment feature class for areas where census blocks > 2 sq. mi. Wireless Provider Service Availability Areas submitted by polygonal area are simply loaded into the NTIA geodatabase Poly_Bndry feature class.

Wireline Provider

The polygonal data is georeferenced and loaded into the Poly_Bndry feature class. The polygon is then attributed, manually if necessary. Depending on the area, census blocks < or => 2 sq. mi., a selection set of either census blocks or road segments that intersect the polygon boundary is created. The attributed polygon

boundary is then joined with census blocks or road segments table to attribute accordingly. This join is performed as many times as necessary for multiple Trans Tech values for each Provider/County Area combination. The NTIA deliverable is the census block or road segment geodatabase table.

Wireless Provider

The polygonal data is georeferenced and loaded into the Poly_Bndry feature class. The polygon is then attributed, manually if necessary. Multiple Poly_Bndry records are created for multiple Trans Tech values for each Provider. The NTIA deliverable is the polygon boundary geodatabase table.

Middle/Last Mile Data Integration

If not already in the standard template, the data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. The point features are geo-located utilizing the lat/long information provided. The NTIA deliverable is the middle or last mile geodatabase table.

Community Anchor Institution Integration

Providers supplied some Community Anchor Institution (CAI) data with the data submittals. But the majority of the data was collected from existing GIS Layers maintained by the COT on their KYGEONET public website. Some of the data was collected by outreaching to CAIs through state agencies and their contacts, and having CAIs complete an online survey at http://www.bakerbb.com/ky_institution_survey/.

Provider CAIs

If not already in the standard template, the data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. The point features are geo-located utilizing the lat/long information provided. Address data is used to geocode locations only when Lat/Long data is not provided.

Commonwealth CAIs

CAI shapefiles were downloaded from the KYGEONET website. The shapefiles were then exported to the NTIA geodatabase CAI feature class. Various sources for obtaining broadband information for the CAIs were utilized. Various state agencies provided some of the information, i.e.; Council on Postsecondary Education (CPE) provided tabular broadband information for schools and libraries and COT provided tabular broadband information for health departments. A CAI data survey website was also deployed and the URL distributed by various state agencies to the CAI contacts. Data from all of these sources were then aggregated into the CAI geodatabase table for the NTIA deliverable.

USAC –CAI Web Scraping

To enhance the CAI inventory, a web scraping tool has been developed to automatically query the USAC public website, http://www.slforms.universalservice.org/DRT/Default.aspx, in a batch mode and extract school and library CAI data for Kentucky. This extracted information supplements the CAI data collected by the other methods.

Typical Speeds from Other Sources

Because not all providers are submitting the typical speed attribution with their data, a method to fill in the missing information has been developed using other sources. The method utilizes speed test data supplied through the FCC speed test information as well as from other speed test data that we are independently collecting. Business rules have been established so quality and realistic typical speeds are produced. The end result is a more complete data submittal to NTIA.

Propagation Modeling

Fixed wireless broadband transmission is a diverse technology. Service may be transmitted over licensed and unlicensed spectrum, and delivered by larger corporate or smaller business entities, many of which serve rural areas of the State. This diversity has resulted in varying levels of SBI participation including Providers that have:

- participated,
- refused to participate,
- wished to participate but lack adequate capabilities and/or tools, or
- supplied data of marginal accuracy

The NTIA's supplemental grant funding has provided the means to generate propagation models to supplement and validate the above scenarios. In addition, the NTIA has identified fixed wireless service coverages with unusual shapes for state grantee analysis.

To facilitate development of propagation mapping, additional tower/antenna information is being requested from fixed wireless broadband providers. For those providers not responding to requests for required tower/antenna information, an attempt is made to gather the information through 3rd party sources and field investigation. The Provider, 3rd party and/or field data is processed using Terrain Analysis Package (TAP) software to develop propagation models. Maps of the resultant propagation study are sent to the fixed wireless providers for their feedback on the propagation model produced for their company.

Data Verification Summary

Kentucky's broadband mapping project employs a multi-prong approach to ensure the provider data is accurate and complete. In summary, the project employs the following validation methodologies and resources:

- Provider Validation
- Data Validation via Market Intelligence Sources
- Data Validation Using State Supplied Data Points
- Field Validation
- Wireless Coverage Analysis
- Topology Validation
- Automated Validation Processing
- Confidence Level/Statistical Modeling
- SBDD Check Submission
- Stakeholder Validation

The remainder of this verification section describes the various methods in greater detail.

Provider Validation

After data development, service availability maps are generated and submitted to the providers to validate their mapping results. This provides a "sign off" on the interpretation of the submitted data and extends the outreach efforts by providing a visual representation of the data to be delivered to the State and the NTIA.

Types of Provider Maps

Provider maps generally consist of the following types.

Outreach Maps

Often, providers will send data which does not contain all the information needed for a NTIA compliant dataset. In such cases, as an aid to the outreach communication, it may be necessary to produce a map to help the provider locate their service area or verify data they have provided. These maps may take many forms, but generally are of two types:

- General Location Maps – these maps are often produced when the provider does not have a list of address or other standard submittal data and needs help defining their service area. A typical map will show counties, major roads, and towns of the general area the provider has stated as their service area. The intent of the map is to give the provider a way to markup or delineate their service area. If a provider has not provided required attribute information such as Technology of Transmission, Speed Data, etc. then it may be necessary to add a visual clue to this data like an information stamp on the map that they can easily fill out. If the provider sends the map back with a service area boundary, this can then be digitized and sent back to the provider for verification.
- Verification of Provider Supplied Boundaries – these maps are produced when the provider has sent service area boundary information which is confusing or otherwise unclear. Often these are produced when providers send CAD maps, hand drawn maps that need digitization, or lists of zip codes or counties served. A typical map will place the interpreted boundary over a location map so the provider can verify the service area. As with the General Location Map, information stamps or other visual clues may be placed on the map.

Initial Verification Maps

Once the provider data has been processed and the census block and road segment feature classes created, an Initial Verification Map (Figure 5) is produced to give the provider a visual representation of their service area by census block. These maps enable the provider to verify their service area and make changes if necessary. Initial Verification Maps are produced using a set of standards and produced at the highest resolution necessary to convey the map information to the provider. Initial Verification Maps are also produced for Wireless Polygon areas.

Detailed Verification Maps

Providers who have questions about their service areas may request additional information to help clarify issues. In these cases it may be necessary to create a Detailed Verification Map to highlight the areas in question. Detailed Verification Maps provide the same information as Initial Verification Maps only at a higher resolution. Several maps may be needed to accurately portray an area in question.

Revised Maps

Revised maps take two forms:

- Initial or Detailed Verification Maps which have been annotated or marked-up by the provider
- Outreach produced Initial or Detailed Verification Maps incorporating provider changes

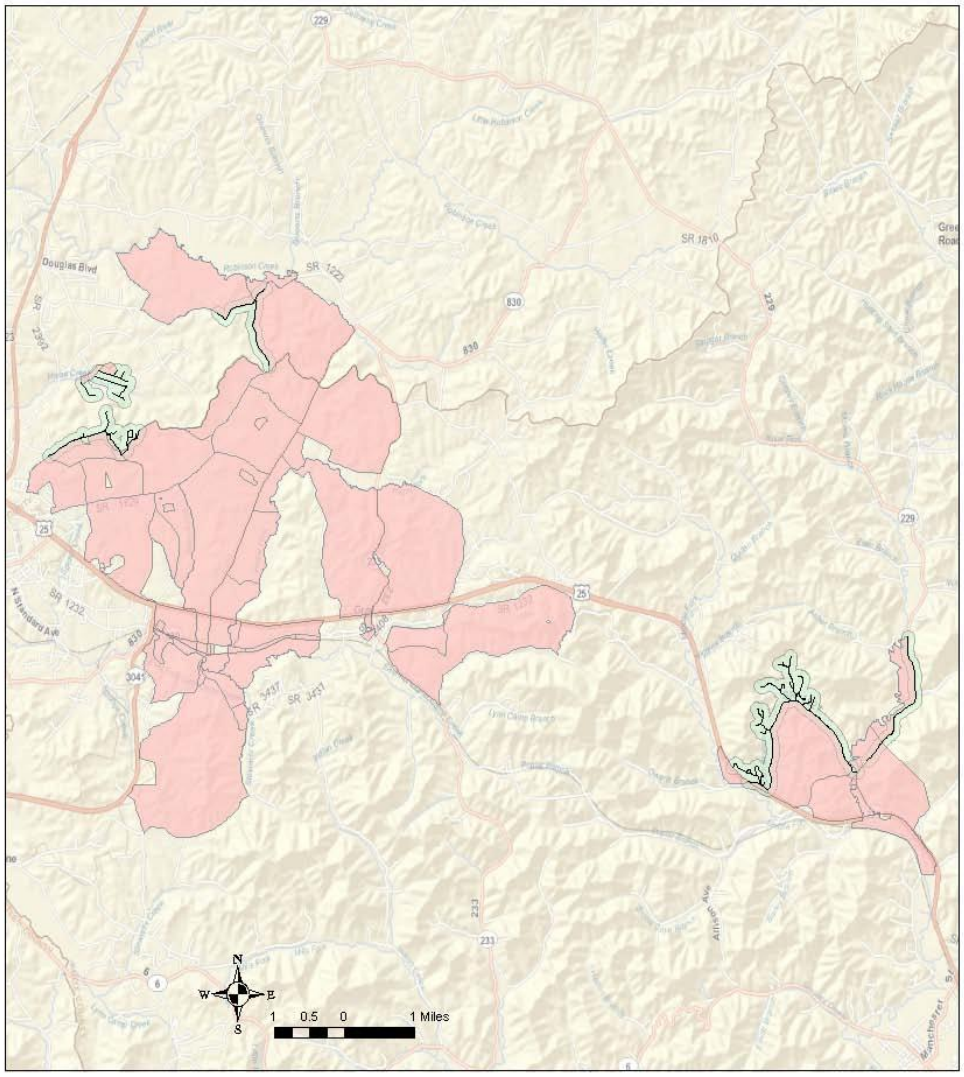


Figure 5 Provider Map

Data Validation

A critical component of the project is the validation of the data submitted by the broadband service providers. Data from various sources, as described in more detail in the following sections, is utilized to develop a level of confidence in the data received from the broadband providers.

Validation Data Set Collection and Development

This validation process employs data sets developed or acquired from different sources as described in the following sections.

Provider Feedback Loop: Maps of completed provider service areas and data are furnished back to the providers for confirmation of the processed/aggregated information. Feedback is integrated into the each Provider's dataset.

Broadband Market Analysis (BMA) Wireline Market Intelligence Data: Data is extracted from internal and commercial databases defining geographic service areas of telephone and cable companies and locations of central office (CO) switches and areas upgraded with fiber. The geographic areas are overlaid with Census demographic data on housing unit counts and density. The areas are then modified based on standard business practices for conducting service build-out and offering broadband service relative to housing density and other variables, such as distance from CO and other infrastructure elements, type of cable franchise (e.g., Census Place vs. Unincorporated County) This represents the first pass conservative estimate of coverage.

The above methods and data sources are supplemented by other data sources and methodologies, including: 1) connectivity data points acquired from InfoUSA that include ISP and type of connection (e.g., DSL, cable modem, dial-up, wireless, fiber) providing Internet service to specific geo-coded (i.e., by Latitude and Longitude) residential addresses; 2) web-based and telephone research, including address-level service-availability queries of web sites operated by service providers and independent entities. This multi-sourced MBA dataset is used as a validation source for provider service area coverage, Technology of Transmission, and Speed.

American Roamer Wireless Market Intelligence Data: Commercially available dataset used as an independent source to verify information submitted by Providers of wireless broadband service. This dataset is used as a validation source for provider service area coverage.

Online Public Survey and Speed Test: A Broadband Mapping Public Survey Site is deployed. Site visitors are requested to provide data on broadband availability, technology, service type (e.g., speed tier) service provider name; monthly prices paid and measured downstream and upstream speeds. In addition to State promotion via press releases to the general public, the State Council on Postsecondary Education (CPE) also promoting participation on this survey to the faculty and student population. This dataset is used as a validation source for provider service area coverage, Technology of Transmission, and Speed.

Prior Broadband Mapping: Statewide coverage areas for Cable, DSL, and Fixed Wireless providers that were aggregated as part of a previous broadband mapping effort for the Commonwealth of Kentucky are used to validate against Provider submitted data. In addition to the service areas, the DSL and Fixed Wireless layers contain general speed information that can be compared against Provider submitted data.

FCC Speed Test: The FCC speed test data includes the IP addresses for each specific speed test conducted. This IP address is queried against a web search engine to determine the Provider assigned to that address and is used as a validation source for provider service coverage and typical speeds.

Field Data Acquisition: Broadband technicians visited a sampling of census block locations to gather broadband data to be used for validation. The following criteria were taken into account when developing the census block sampling dataset:

- urban vs. rural census block characteristic
- censes block grouping
- land vs. water census block characteristic

The overarching mission of the Federal broadband stimulus program is to expand Broadband service to areas that are currently unserved and underserved. Also, the market intelligence validation sources typically represent some rural, but more urban areas. Thus, our field data collection efforts were targeted more towards the rural areas; split 90% rural, 10% urban.

Additionally, a study by Penn State University (Glasmeier 2002) notes that a large number of census block groups typically fit within any given cable or telephone company service areas. Therefore, our field sample was also based on selection of one census block per block group. The selected census block also had greater than 50% land area, versus water. There are a total of 3, 158 census block groups statewide. Using a statistical sample size calculator based upon the number of block groups in the state and +/- 4% margin of error at a 95% confidence level, the sample size is 529 census block locations (Figure 6).

For the 529 census blocks that were visited, 2455 individual wired/wireless data elements were recorded and 3024 pictures were taken at those locations. This field collected dataset is used as a validation source primarily for wireline and wireless technology of transmission and middle mile, and for wireless speed.

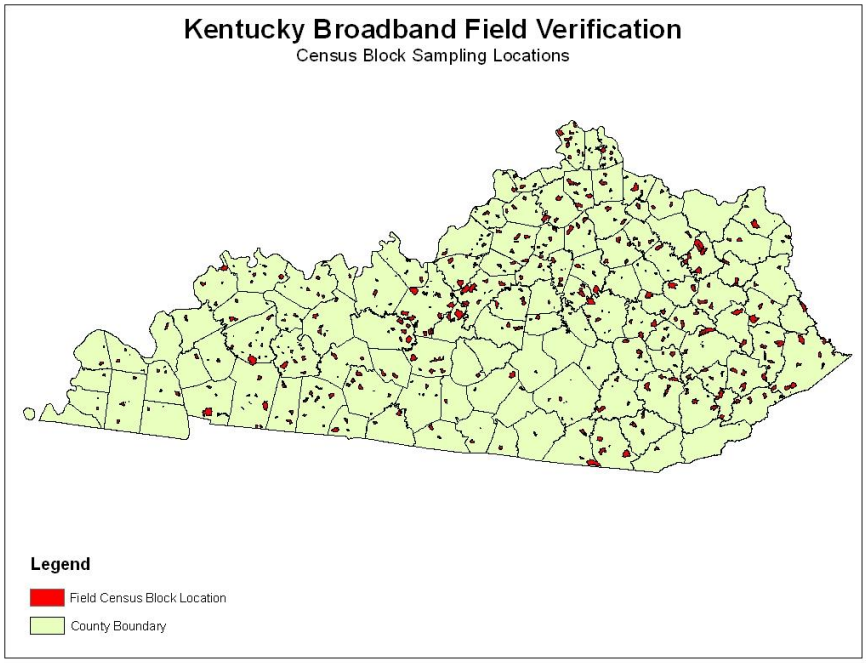


Figure 6 Field Verification Sampling Locations

For each census block in the sample set, broadband technicians collected data using Panasonic Toughbook computers, loaded with MapPoint mapping software, and a customized Microsoft Access data collection form with the ability to automatically import GPS coordinates. The sample census blocks were pre-loaded and directly accessible from MapPoint. Two types of data collection were conducted; infrastructure observation and wireless speed testing; and the results were recorded and linked to the corresponding field location coordinates within the designated sample census block. The information collected by the field broadband technicians includes:

Wireline:

- GPS coordinates
- circuit infrastructure feeding the area (copper, fiber, cable)
- collect site pictures

Wireless:

- GPS coordinates
- internet speed test

This field collected dataset is used as a validation source primarily for wireline and wireless technology of transmission and middle mile, and for wireless speed.

Independent 3rd Party Validation: Murray State University coordinated the efforts of resources at the University of Louisville and the Kentucky Community and Technical College System (validation team) to validate the collection methods and collected data associated with the collection of broadband availability data. This validation data developed from this effort was subsequently integrated into the Statistical Evaluation and Assessment System (SEAS) to verify the data submitted by the broadband providers.

The validation team review included:

a. Validating the list of providers being used by the mapping vendor to make sure all providers are included.
b. Validating the list of state-provided and Census Tiger Data to identify the location of health facilities, schools, libraries, hospitals, universities, public buildings, etc.
c. Reviewing provider outreach methodology being used by the mapping vendor.
d. Reviewing submission options, the Non-Disclosure Agreement and the timeframe for submission.
e. Identifying Business Intelligence data sources to validate provider information.
f. Reviewing mapping vendor's website used to collect comment/survey forms from visitors to validate the broadband coverage in their area.
g. Observing the data collection and data entry process and the ongoing steps in the development of the final products.

Once data was collected, the validation team provided a review that included:

a. Cross checking of data for accuracy
b. Statistically representative and significant samples to validate data, especially in rural and potentially underserved.

Limited field census and telephone surveys were also used to validate data in situations where the data cross checks and statistical samples are not able to validate data provided by the mapping vendor. Faculty and

students from campuses of the Kentucky Community and Technical and College System (KCTCS) conducted the field census work to validate local adoption rates. KCTCS has 16 colleges and over 60 campuses to provide state-wide coverage for field census work.

The work performed, and being performed by the validation team can be summarized in four areas: (1) Audit, (2) Selective Surveys, (3) Reconcile Survey and Provider Data, and (4) Field Test to Resolve Discrepancies.

Audit – At the beginning of the project it was decided that the best way to obtain quality data was to make sure that the initial data collection was of the highest quality that it could be. The validation team concentration its initial efforts in working with the mapping vendor to get the best quality data and also the largest quantity of data that could be obtained. Mapping vendor processes were reviewed and suggested improvements provided. Web sites and documents that were to be used for data collection were evaluated and improvements suggested. Provider lists were reviewed and additional vendors or potential vendors were identified by the validation team. Once data collection began, the validation team also worked with the mapping team to increase the amount of data collected. KCTCS provided web survey sites to students and faculty across the state to increase participation. Once the data was collected the validation team worked to identify data anomalies and locations where additional data collection was required.

Selective Surveys – The data audits identified locations where there was insufficient data to make valid conclusions about broadband availability. The validation team used a call center to place selective surveys in the targeted areas within the state. In many cases the insufficient data was the result of the failure of vendors to provide data to the mapping vendor. The selective surveys provide validation of the availability of broadband or the absence of broadband within a specific area. This information allows the mapping vendor to concentrate their efforts to obtain the required data from the appropriate vendor. The call center efforts reached almost 10,000 new households that had not been sampled by other methods. The data indicated that 68.8% had computers, 64.7% has access to the Internet, and 56.7% has broadband access. The new data points were located in rural areas of the state and were focused on areas that had been underrepresented in prior data collection efforts.

Reconcile Survey and Provider Data – The mapping vendor survey data (from web surveys), the provider data, and the selective surveys done by the validation team provide an additional reconciliation of the data. While the importance of knowing where broadband is available is critical, it is just as important to know where broadband is not available. The comparison of the various data sources allow for a high confidence in identifying where broadband is available. Additionally, the data reported on the web surveys and the phone surveys identify pockets of citizens of the Commonwealth that don't have access to broadband. The validation team used the data reported by the providers, the data collected by the mapping vendor, and the validation survey data to identify areas of interest for the field data collection efforts. The focus of the field data collection efforts are areas with no reported service, areas where individuals report no availability, and areas where only mobile wireless has been reported as being available for broadband service.

Field Test to Resolve Discrepancies – The reported territory covered by wired broadband infrastructure is reliable. However, the reported territory covered by wireless broadband infrastructure (especially mobile wireless) is less reliable. Many factors can impact the availability of the wireless signal. We simply have to think about our cell phone usage and the frequency of dropped calls or no service availability. It is relatively easy for a

vendor to say they provide service to an entire geographic area. The validation team developed software to check on the level of mobile wireless availability and to make sure it is at broadband speeds. The validation team drove mobile devices around the state collecting signal strength and doing periodic speed test to validate the availability of broadband. The initial focus was on areas reported to have no service and areas that only have mobile broadband reported. Test data was collected to validate the data collection process and identify required equipment.

Provider Data Validation Process

Provider Feedback Loop: Feedback received from the providers is visually inspected and integrated directly into the mapping GIS database.

Service Area Validation Data: The MBA wireline service area data is tabular and contains a separate record for each provider/technology of transmission combination with an associated census block or TIGER road segment, depending on the whether the size of the census block area (=/< or > 2 sq. mi.). This data is exported into an ArcGIS data format. The American Roamer and Prior Mapping service area data is already in and ArcGIS data format. The validation data is then joined to the Provider service area data by census block or TIGER road segment ID. Any database records in the Provider or Validation tables that cannot be joined are output to a separate layer that indicates the areas of discrepancy between the two datasets. The joined tables are then queried to detect any speed discrepancies which are also output to a separate discrepancy layer.

Online Surveys, Field and Independent 3rd Party Validation Data: The Public and Targeted Business/Household survey, field and independent 3rd party validation data are also collected in tabular database format, and represent a specific lat/long spatial location for each record. This data is exported into ArcGIS data format, joined to the provider data, queried to validate pertinent attribution. Again, records not joined and or with detected attribution discrepancies are output to separate GIS layers.

Topology: The ArcGIS Validate Topology Tool is used to flag any topology issues in the broadband data. Flagged issues are reviewed to identify false positives and update true errors as required.

SBI Check Submission: The NTIA-provided SBI Check Submission tool is utilized to validate that the deliverable broadband data is consistent with the business logic rules set forth by the NTIA and a passing receipt is provided with the data submittal to NTIA.

Stakeholder Feedback: The state broadband mapping website includes a feedback function. Comments received from stakeholders are reviewed and used to validate provider data submissions.

Validation and Confidence Level Reporting

To facilitate validation and confidence level reporting, Baker deployed a validation application called Statistical Evaluation and Assessment System (SEAS), shown in Figure 7, which automatically compares the multiple independent validation datasets against the broadband service provider's supplied information. The SEAS uses statistical methodologies to report the confidence level in the spatial and attribute accuracy of the information. Appendix B shows the validation workflow.

The SEAS comparison is a three-part validation process:

1. Comparison of the collected validation source against the aggregated broadband provider data.
2. Match percentage calculation for each provider reported in the DataPackage.xls, "Provider Table" tab, "Comments" column.
3. Confidence score calculation displayed on the state broadband website.

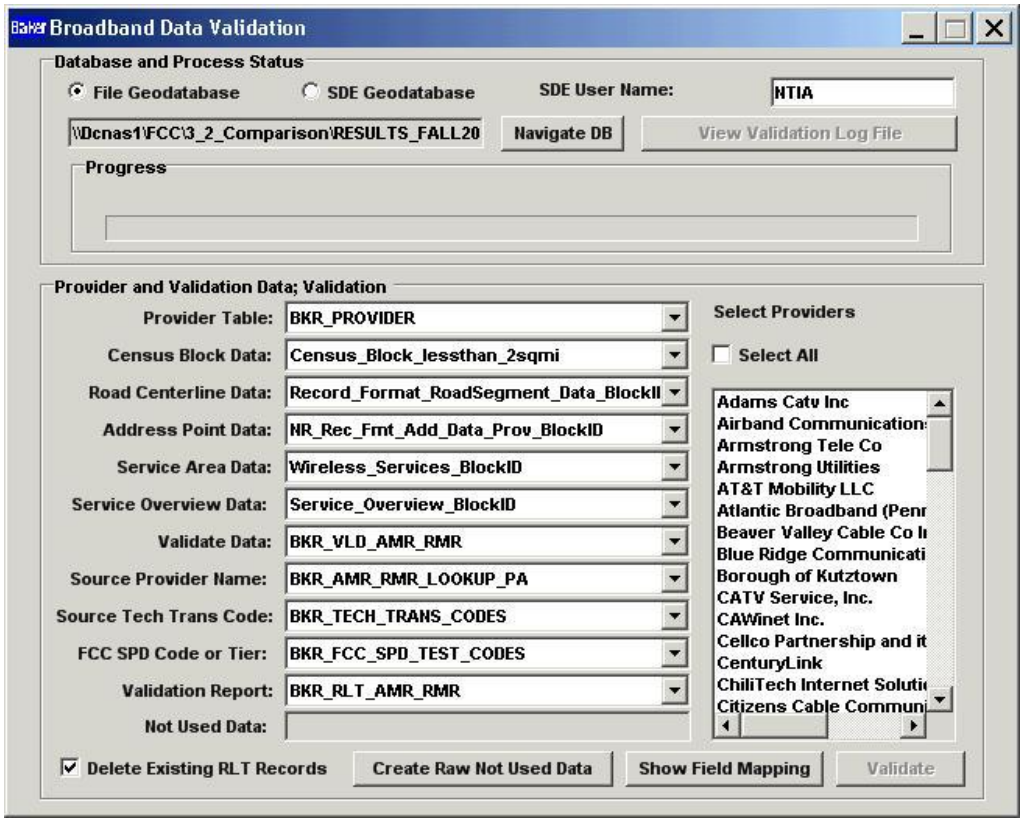


Figure 7 Statistical Evaluation and Assessment System (SEAS)

After completing all validation data source collections, SEAS is used to automatically compare the multiple validation datasets against the aggregated broadband data which came from the providers. Through the SEAS accumulation table, it produces a match percentage per broadband service record based upon the number of matches that record has against each validation source. The matched percentage for each record is the result of the total count of the matched validations for the record divided by the total validation source being compared against the record. A validation confidence rating/score is then assigned on a scale of 1 to 5 based upon the percentage of validation source matches as per the following score results:

- 1 Star = 0% - 19% Match
- 2 Stars = 20% - 39% Match
- 3 Stars = 40% - 59% Match
- 4 Stars = 60% = 79% Match
- 5 Stars = 80% - 100% Match
- "No Analytics" = No validation source available for that provider

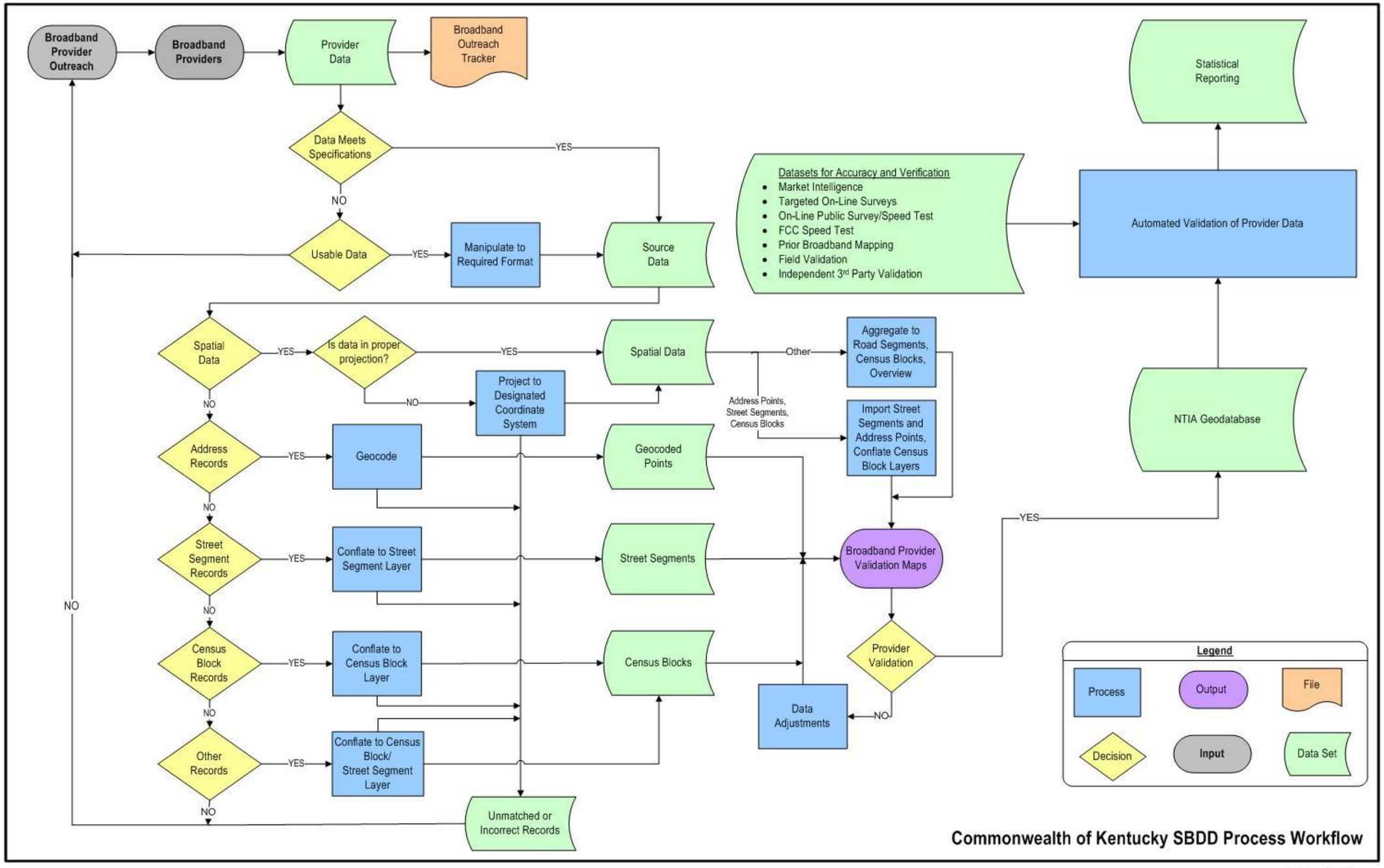
The matched percentage for the records for each provider are summarized and then divided by the total count of the records to create the final matched percentage for the specific provider. These percentages are included in DataPackage.xls on the Provider Table tab in the Comments column.

Low Confidence Provider Feedback

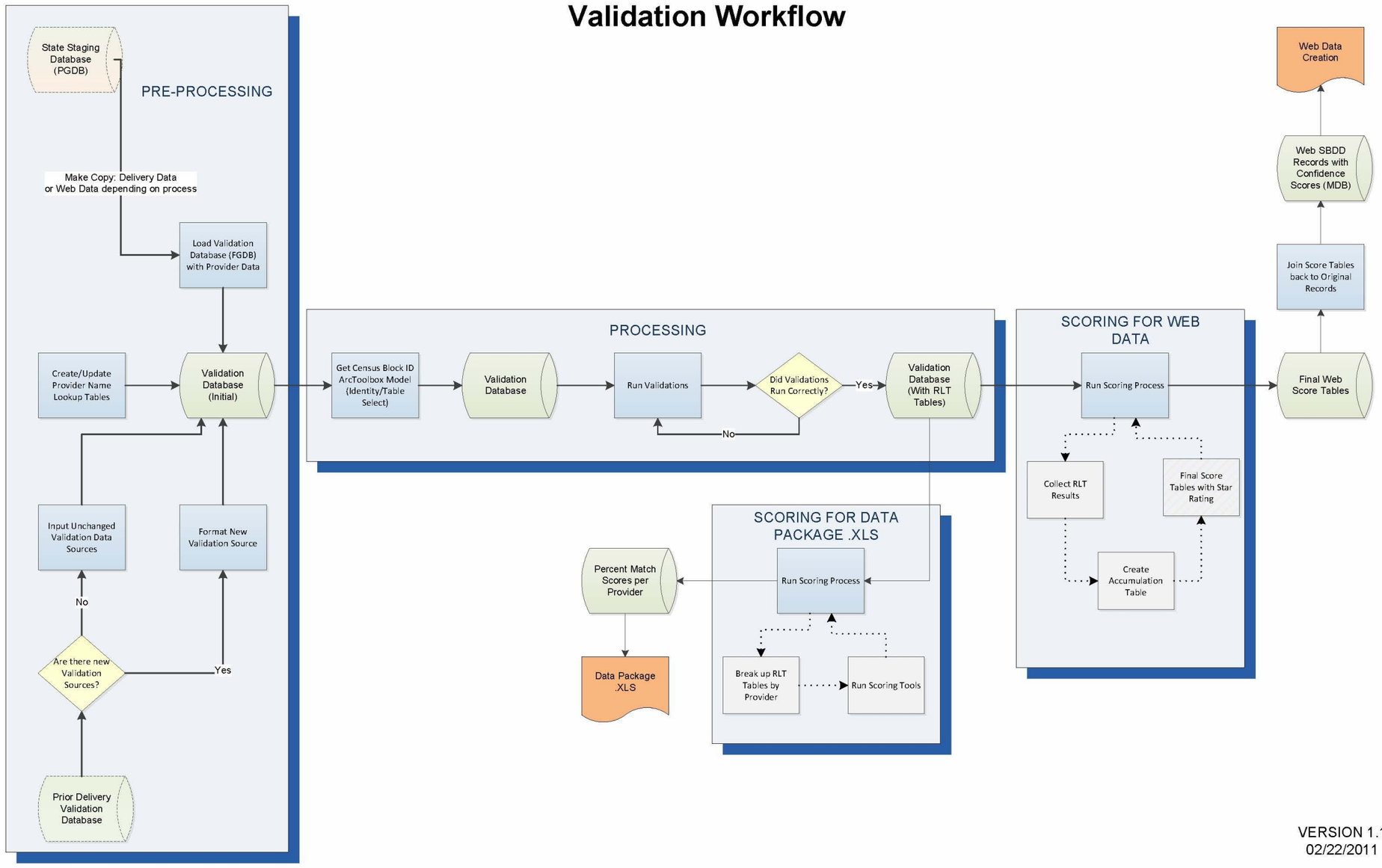
Provider data which is assigned a low confidence (1 or 2 stars) through the SEAS process is communicated back to the provider through a feedback loop. Generally, the low confidence feedback and reconciliation is a continuous refinement process and will occur between update cycles. The goal is to provide this feedback through the Provider Data Update Webportal via a web connection that is available and rolled out to providers in January 2012.

Changes and Corrections Documentation

With each NTIA semiannual data submittal, changes and corrections documentation is provided. Significant changes in a provider's status or data, corrections to previously supplied data, providers supplying data for the first time, etc. are specified by Provider name in the Changes and Corrections document.


Broadband Provider Outreach
Broadband Providers
Provider Data
Broadband Outreach Tracker
Data Meets Specifications
YES
NO
Usable Data
YES
Manipulate to Required Format
Source Data
Datasets for Accuracy and Verification
Market Intelligence
Targeted On-Line Surveys
On-Line Public Survey/Speed Test
FCC Speed Test
Prior Broadband Mapping
Field Validation
Independent 3rd Party Validation
Statistical Reporting
Automated Validation of Provider Data
NTIA Geodatabase
Spatial Data
YES
Is data in proper projection?
YES
NO
Project to Designated Coordinate System
Spatial Data
Other
Aggregate to Road Segments, Census Blocks, Overview
Address Points, Street Segments, Census Blocks
Import Street Segments and Address Points, Conflate Census Block Layers
NO
Address Records
YES
Geocode
Geocoded Points
NO
Street Segment Records
YES
Conflate to Street Segment Layer
Street Segments
NO
Census Block Records
YES
Conflate to Census Block Layer
Census Blocks
NO
Other Records
YES
Conflate to Census Block/ Street Segment Layer
NO
Unmatched or Incorrect Records
Broadband Provider Validation Maps
Provider Validation
YES
NO
Data Adjustments
Legend
Process
Output
File
Decision
Input
Data Set
Commonwealth of Kentucky SBDD Process Workflow
October 1, 2010

State Broadband Data Validation Workflow



VERSION 1.1
02/22/2011

Appendix C: Master Outreach List

Filling Company DBA	Filling Company Name	Status
360networks		Not a Broadband Provider or Reseller
ACN Communication Services, Inc.		Not a Broadband Provider or Reseller
Alltel Communications of Virginia No. 1, LLC		Not a Broadband Provider or Reseller
Altro TV Company Inc.		Not a Broadband Provider or Reseller
Banana Communications, LLC		Not a Broadband Provider or Reseller
Bowling Cable TV		Not a Broadband Provider or Reseller
BroadLink		Not a Broadband Provider or Reseller
Broadview Networks, Inc.	Broadview Networks, Inc.	Not a Broadband Provider or Reseller
Buffalo-Lake Erie Wireless Systems Co., L.L.C.		Not a Broadband Provider or Reseller
C & C TV Service		Not a Broadband Provider or Reseller
C & W Cable, Inc.		Not a Broadband Provider or Reseller
C Spire Wireless		Not a Broadband Provider or Reseller
Cainpro Communications		Not a Broadband Provider or Reseller
Charter Communications		Not a Broadband Provider or Reseller
City of Raceland		Not a Broadband Provider or Reseller
Community TV Inc		Not a Broadband Provider or Reseller
Cook Inlet/VS GSM VII PCS, LLC		Not a Broadband Provider or Reseller
Crossroads License Holding Sub A Inc.		Not a Broadband Provider or Reseller
Crossroads Wireless, Inc., Debtor-in-Possession		Not a Broadband Provider or Reseller
CSI Telecom Group Inc.	CSI Telecom Group Inc.	Not a Broadband Provider or Reseller
Derby Divestiture Trust		Not a Broadband Provider or Reseller
EnTelegent Solutions, Inc.		Not a Broadband Provider or Reseller
Evarts T.V. Co. Inc.		Not a Broadband Provider or Reseller
Franklin Electric Plant Board		Not a Broadband Provider or Reseller
Granite Telecommunications, LLC		Not a Broadband Provider or Reseller
iNetworks Group, Inc.		Not a Broadband Provider or Reseller
Johnny Wilcop Cable		Not a Broadband Provider or Reseller
Kentucky Data Link	Kentucky Data Link	Not a Broadband Provider or Reseller
L & L Communications		Not a Broadband Provider or Reseller
MetroFastNet	MetroFastNet	Not a Broadband Provider or Reseller
Morehead State University Campus		Not a Broadband Provider or Reseller
Netpower, LLC		Not a Broadband Provider or Reseller
Network Telephone		Not a Broadband Provider or Reseller

NewWave Communications	NewWave Communications	Not a Broadband Provider or Reseller
Northstar Technology, LLC		Not a Broadband Provider or Reseller
NTCH, Inc.		Not a Broadband Provider or Reseller
Pritchtech		Not a Broadband Provider or Reseller
Qwest	Qwest	Not a Broadband Provider or Reseller
Riverside Communications		Not a Broadband Provider or Reseller
SCS Wireless		Not a Broadband Provider or Reseller
SI Spectrum, LLC		Not a Broadband Provider or Reseller
Sky Blue		Not a Broadband Provider or Reseller
SkywayUSA	Skyway	Not a Broadband Provider or Reseller
South Kentucky RECC (formerly Monticello Plant Board)		Not a Broadband Provider or Reseller
SpeedBeam	SpeedBeam Wireless, Inc.	Not a Broadband Provider or Reseller
Systems Solutions	Systems Solutions	Not a Broadband Provider or Reseller
Tennessee RSA No. 3 Limited Partnership		Not a Broadband Provider or Reseller
US Digital Online	US Digital Online	Not a Broadband Provider or Reseller
Vanceburg Electric Plant Board		Not a Broadband Provider or Reseller
Windjammer Communications LLC		Not a Broadband Provider or Reseller
Wirefree Partners III, LLC		Not a Broadband Provider or Reseller
Alltel Communications, LLC		Other
ALLTEL Newco LLC		Other
Broadview Networks Inc	Broadview Networks Inc	Other
Cavalier Telephone		Other
Cellco Partnership		Other
Cincinnati Bell Extended Territories, LLC		Other
Cincinnati SMSA Limited Partnership		Other
CNI Wireless, Inc.	CNI Wireless, Inc.	Other
Cogent Communications		Other
Comcast - Southern Division		Other
Covad Communications Company	Sold to MegaPath. Now an affiliate of MegaPath. NDA executed 3-15-2010 (non-standard)	Other
Crystal Broadband Networks	Crystal Broadband Networks	Other
DC Kentucky Newco, LLC		Other
Galaxy Cablevision	Member of kcta SOLD TO ZITO MEDIA. Their data now submitted under Zito Media.	Other

GTE Wireless of the Midwest Incorporated		Other
Hazard Television Co Inc	Hazard Television Co Inc	Other
Horizon Telecom		Other
Insight Communications Midwest, LLC	Bought by Time Warner Cable. Now an affiliate or DBA to Time Warner. Member of kcta	Other
Kentucky Computer Service (KCSMax)		Other
Kentucky RSA No. 1 Partnership		Other
KYWISP, LLC		Other
MCC Telephony of the South, LLC		Other
MediaFLO/Qualcomm	MediaFLO/Qualcomm	Other
New Cingular Wireless PCS, LLC		Other
New Par		Other
Norlight, Inc.	See Q-Wireless. Acquired by Windstream, then bought by Q-Wireless. Operates through Q-Wireless.	Other
PAETEC Communications, Inc.	acquired by windstream Dec 2011	Other
Powertel Memphis Licenses, Inc.		Other
SITCO	SITCO	Other
Sprintcom Inc		Other
Telecommunications Management, LLC		Other
Time Warner NY Cable LLC		Other
Tri-Star Communications, Inc	Tri-Star Communications, Inc	Other
Vista (Mirror 2) PCS License Holding, LLC		Other
Vista License Holdings, L.L.C.		Other
W. Stephen Cannon, Management Trustee		Other
WIN Entersprises		Other
Wirelessco, L.P.		Other
Blue One Communications, Inc.	Blue One Communications, Inc.	Potential
Chapel Communications Inc.	Chapel Communications Inc.	Potential
IgLou	IgLou	Potential
Kentucky OnLine, Inc.	Kentucky OnLine, Inc.	Potential
Kentucky Telephone Company	Kentucky Telephone Company	Potential
Lightyear Network Solutions, Inc.		Potential

SouthEast Telephone Inc.	SouthEast Telephone Inc.	Potential
Win.net Internet	Win.net Internet	Potential
Access Cable Television, Inc.	Access Cable Television, Inc.	Provider
AK Internet Services	Access Kentucky Inc.	Provider
ALTIUS Broadband	ALTIUS Broadband	Provider
Appalachian Wireless	East Kentucky Network, LLC	Provider
Armstrong Utilities	Armstrong Utilities	Provider
AT&T Corp, Inc.	AT&T Corp, Inc.	Provider
AT&T Kentucky	BellSouth Telecommunications, Inc.	Provider
AT&T Mobility LLC	AT&T Mobility LLC	Provider
Avolutia, LLC	Shelby Broadband	Provider
Axon Access	Axon Access	Provider
Ballard Telephone Cooperative	BTC	Provider
Barbourville Online	Barbourville Utility Commission	Provider
Bardstown Cable TV	City of Bardstown	Provider
BGMU	Bowling Green Municipal Utilities	Provider
Big Sandy Broadband, Inc.	Big Sandy Broadband	Provider
Blazing Speeds LLC	Fast Internet	Provider
Blue Zoom Wifi	Blue Zoom Inc.	Provider
Bluegrass Cellular	Cumberland Cellular Partnership	Provider
Bluegrass Cellular	Bluegrass Wireless LLC	Provider
Bluegrass Cellular	Bluegrass Cellular, Inc.	Provider
Bluegrass Cellular	Kentucky RSA #4 Cellular General Partnership	Provider
Bluegrass Cellular	Kentucky RSA #3 Cellular General Partnership	Provider
BluegrassNet	BluegrassNet	Provider
Bracken Cablevision	Standard Tobacco Company, Inc.	Provider
Brandenburg Telecom LLC	Brandenburg Telecom LLC	Provider
Brandenburg Telephone Company	Brandenburg Telephone Company	Provider
Broadlinc Wireless	Broadlinc Communications LLC	Provider
CBW of Kentucky	Cincinnati Bell Wireless LLC	Provider
Cincinnati Bell Telephone	Cincinnati Bell Telephone Company LLC	Provider
City of Bellefonte		Provider
City of Williamstown, Cable & internet Service	City of Williamstown, Cable & internet Service	Provider
Clear.com	Clearwire Corporation	Provider
ClearLinc Broadband	ClearLinc Broadband	Provider

Coalfields Telephone Company, Inc.	Gearheart Communications	Provider
Comcast	Comcast Cable Communications, LLC.	Provider
Community Telecom Services	Community Telecom Services	Provider
ConnectGRADD	Q-Wireless	Provider
ConnectLink, Inc	ConnectLink, Inc	Provider
Cricket Communications, Inc.	Leap Wireless International, Inc.	Provider
Duo County Telecom	Duo County Telephone Cooperative	Provider
Duo County Telephone Cooperative, Inc.	Duo County Telephone Cooperative	Provider
EarthLink, Inc.	EarthLink, Inc.	Provider
Eastern Cable Corp	Eastern Cable Corporation	Provider
Egan Technology Services	Egan Technology Services	Provider
EPBNET	Electric Plant Board of Russellville Ky	Provider
FastNet	Fastnet Wireless LLC	Provider
FiberNet LLC	FiberNet LLC	Provider
Foothills Broadband	Foothills Rural Telephone Cooperative Corporation Inc.	Provider
Frankfort Plant Board	Frankfort Electric & Water Plant Board	Provider
Franklin Municipal FiberNET	City of Franklin	Provider
Glasgow Electric Plant Board	Glasgow Electric Plant Board	Provider
Harlan Community Television, Inc.	Harlan Community Television, Inc.	Provider
Henderson Municipal Power & Light Company	Henderson Municipal Power & Light Company	Provider
Highland Telephone Cooperative	Highland Telephone Cooperative	Provider
Hopkinsville Electric System	Electric Plant Board of the City of Hopkinsville	Provider
HughesNet	Hughes Communications, Inc.	Provider
Inside Connect Cable	Inside Connect Cable	Provider
Integrated Networks, Inc.	Integrated Networks, Inc.	Provider
Inter Mountain Cable, Inc	Inter Mountain Cable, Inc	Provider
Irvine Community Television, Inc.	Irvine Community Television, Inc.	Provider
Ken-Tenn Wireless, LLC	Ken-Tenn Wireless, LLC	Provider
Kentucky WiMAX	Kentucky WiMAX	Provider
Kentucky Wireless	Kentucky Wireless	Provider
KRCC	KRCC	Provider
KYWIFI	KYWIFI	Provider

Level 3 Communications, LLC	Level 3 Communications, LLC	Provider
Liberty Communications, Inc.	Liberty Communications, Inc.	Provider
Limestone Cablevision	Standard Tobacco Company, Inc.	Provider
LOGAN TELEPHONE COOPERATIVE, INC.	LOGAN TELEPHONE COOPERATIVE, INC.	Provider
Lycom Communications, Inc	Lycom Communications	Provider
Mediacom	Mediacom Southeast, LLC	Provider
MegaPath Corporation	MegaPath Corporation	Provider
megaWi	megaWi	Provider
MEWS	Mayfield Electric & Water	Provider
Mikrotec CATV, LLC	Mikrotec CATV, LLC	Provider
Mountain Telephone	Mountain Rural Telephone Coop. Corp., Inc.	Provider
MST Wireless	MST Wireless	Provider
Murray Electric Systems	Murray Electric Systems	Provider
North Central Communications	North Central Communications	Provider
NTELOS	West Virginia PCS Alliance, L.C.	Provider
OCDirect	Ohio County Direct Net	Provider
OMU	OMU	Provider
OOLWireless	Q-Wireless	Provider
Open World	Open World	Provider
PowerNet Global	PowerNet Global	Provider
Princeton Electric Plant Board	Princeton Electric Plant Board	Provider
PRTC	Peoples Rural Telephone Coop. Corp., Inc.	Provider
QKY Wireless	Q-Wireless	Provider
QX.net	QX.net	Provider
Skycasters	Skycasters, LLC	Provider
SOUTH CENTRAL RURAL TELEPHONE	SOUTH CENTRAL RURAL TELEPHONE COOPERATIVE, INC.	Provider
SOUTH CENTRAL TELCOM	SOUTH CENTRAL TELCOM, LLC	Provider
Sprint	Sprint Nextel Corporation	Provider
StarBand Communications Inc.	StarBand Communications Inc.	Provider
Suddenlink Communications	Cebridge Acquisition, LLC	Provider
Suddenlink Communications	Cequel III Communications II, LLC	Provider
Suddenlink Communications	Cequel III Communications I, LLC	Provider
T.V. Service	T.V. Service	Provider
TDS TELECOM	LESLIE COUNTY TELEPHONE COMPANY	Provider
TDS TELECOM	LEWISPORT TELEPHONE COMPANY	Provider
TDS TELECOM	SALEM TELEPHONE COMPANY	Provider

Thacker-Grigsby Telephone	Thacker-Grigsby Telephone Company	Provider
TIME WARNER CABLE	TIME WARNER CABLE LLC	Provider
T-Mobile	T-Mobile USA, Inc.	Provider
tw telecom of kentucky llc	tw telecom of kentucky llc	Provider
VCI INTERNET	RUDDATA CORPORATION	Provider
Verizon Wireless	Cellco Partnership and its Affiliated Entities	Provider
Vortex Wireless	Vortex Wireless	Provider
WildBlue Communications, Inc.	ViaSat, Inc.	Provider
WiMAX Express	WiMAX Express	Provider
Windstream Kentucky East, LLC	Windstream Kentucky East, LLC	Provider
Windstream Kentucky West, LLC	Windstream Kentucky West, LLC	Provider
WK&T Telecommunications Cooperative	West Kentucky Rural Telephone Cooperative Corp., Inc.	Provider
WWGapTel	WWGapTel	Provider
Your Telecommunications Co.	House Enterprises, Inc.	Provider
Zito Media	Zito Media, LP	Provider
Blue One Communications, Inc.	Blue One Communications, Inc.	Reseller
Chapel Communications Inc.	Chapel Communications Inc.	Reseller
EarthLink, Inc.	EarthLink, Inc.	Reseller
Frank Howard TV Cable	Frank Howard TV Cable	Reseller
OCDirect	Ohio County Direct Net	Reseller
TOAST.net	TOAST.net	Reseller

LOUISIANA BROADBAND INITIATIVE LBI

DATA DEVELOPMENT & VALIDATION METHODOLOGIES

WHITE PAPER

State of Louisiana

State Broadband Initiative (SBI)

Broadband Mapping Project

NTIA Data Submittal
April 1, 2013

Baker

Baker

Table of Contents

Table of Figures

Appendices

Introduction

The following sections of this document provide an overview of the process used for the SBI Broadband Mapping data development for the State of Louisiana. The following narrative is depicted in Appendix A, State of Louisiana SBI Process Workflow, and Appendix B, State Broadband Data Validation Workflow, included at the end of this document.

Broadband Provider Outreach Results

As a result of the outreach to broadband providers and investigating whether an internet service provider (ISP) meets the definition of a broadband provider as per the NOFA, the following is a summary of our findings:

- 145 Total Investigated ISPs
- 67 Total Confirmed Broadband Service Providers (Unique Provider/DBA Combinations)
- 52 Broadband Service Providers who Supplied Data (Unique Provider/DBA Combinations)

Attachment C, Master Outreach List, contains additional provider information.

Broadband Provider Outreach Procedure

The following outreach provides the framework for communicating with Broadband Service Providers (Providers). The primary goals of the outreach approach documented herein are to:

- Promote Provider understanding and acceptance of the Broadband Mapping process, results and benefits
- Clarify NTIA Broadband Mapping requirements
- Facilitate data confidentiality agreements as required
- Minimize the submittal of invalid data
- Enhance provider understanding of the semi-annual update process
- Work with Providers to evaluate submittal options to facilitate data submittals

Data Submission Guidelines

Guidelines for the providers' submission of Broadband Mapping Data are documented in the "Data Submission Guidelines". These Guidelines define technical requirements, submission specifications, and coordination and documentation activities.

Louisiana Broadband Providers Website

A URL was deployed (http://www.broadband.la.gov/lbi_providers.asp) to communicate and distribute NTIA NOFA requirements to providers along with outreach and data submittal materials including:

- NTIA NOFA and subsequent clarification
- Outreach letters to providers
- Non-Disclosure Agreement
- Quick Start Guides

- Data Submission Guidelines
- Data Transmittal Letter
- Broadband Data Submittal Templates
- Census TIGER Data
- Data Submittal Assistance Contact Information

Outreach Delivery Vehicles

- A State Broadband Mapping Initiative Call for Data letter from the State Office of Information Technology (OIT) was mailed to all Broadband Service Providers in the State. This initial provider contact letter described the program and the role of Michael baker Jr., Inc. (Baker) acting on behalf of the OIT for Broadband Data Collection and Mapping.
- Baker distributed a follow-up letter to all Providers describing the data submittal requirements and material and help available to aid with the data submittals.
- Submittal assistance was provided to providers that needed help with data submittals.
- Presentations were conducted with various broadband provider associations to present the data submittal requirements and answer questions.
- Email communication and electronic transfer of data was encouraged to facilitate a faster delivery of data and information.
- A URL was deployed and promoted to distribute outreach material and information concerning the Broadband Mapping Project.
- A secure FTP URL was provided for submittal of broadband data by providers.
- A secure Broadband Provider Data Update Webportal was deployed for providers to redline/update their service coverage, rather than supply their updated coverage for the semi-annual data updates.

Secure Broadband Provider Data Update Webportal

A secure web-based application for broadband service providers has been deployed to simplify and automate the semi-annual process for collecting and verifying data. The webportal provides an easy-to-use map redlining tool for updating a provider broadband service area and attributes. It is expected that the simplification and automation of the data collection process will increase participation and improve the timeliness of provider's response, data accuracy and consistency. Providers are being encouraged to utilize this tool but data is still being accepted through other means and formats.

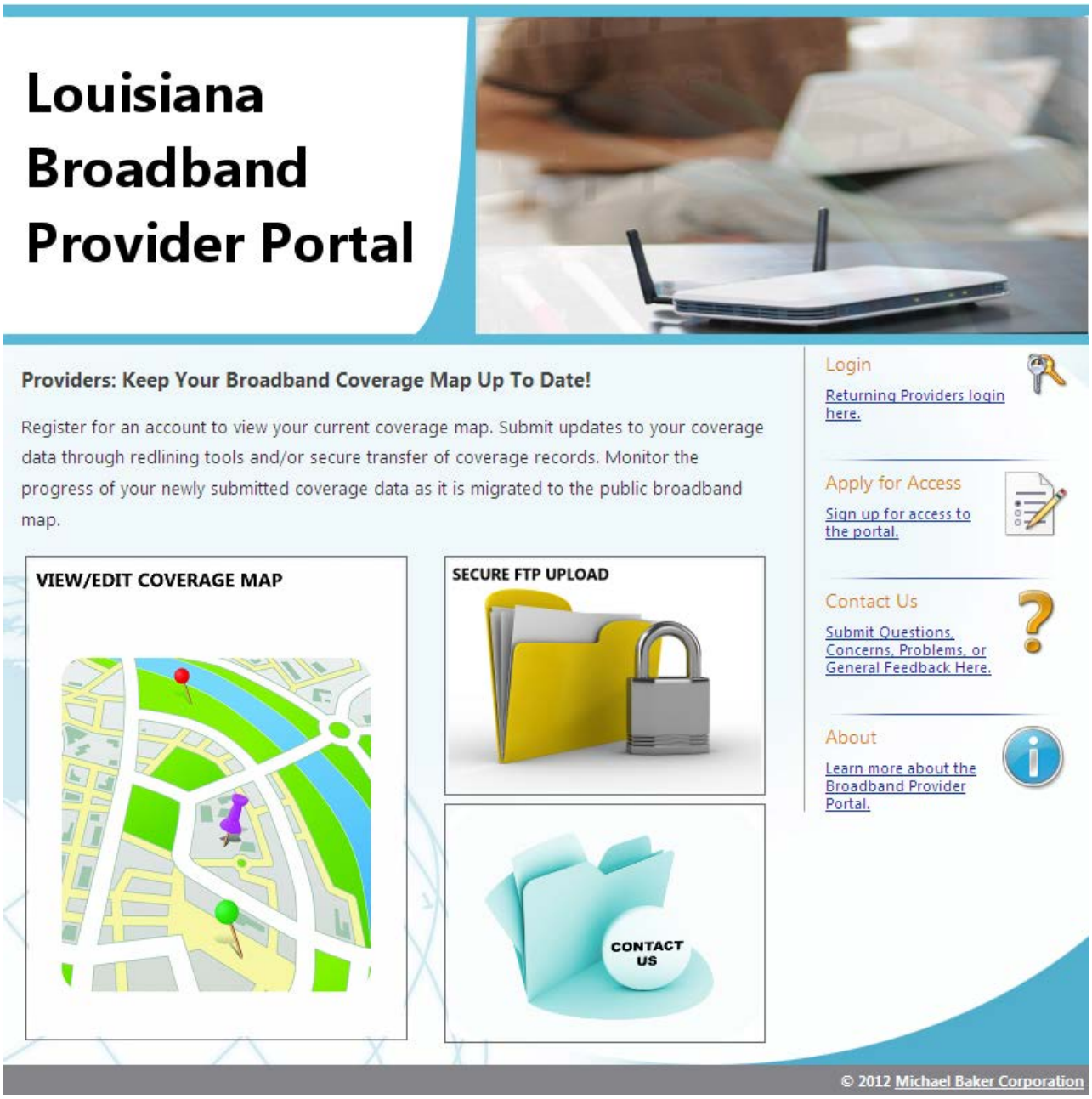


Figure 1 Provider Data Update Webportal Entry Page

The View/Edit Coverage Map functions via secure login/password and secured map services limit broadband providers to see and edit only their own data. Pick lists of valid database attributes eliminates entry errors and create consistency. It also contains a workflow from initial provider input, saving of a provider's work-in-progress, provider formally submitting edits, aggregation into the master geodatabase, soliciting provider approval of aggregated data, and final approval of the edit.

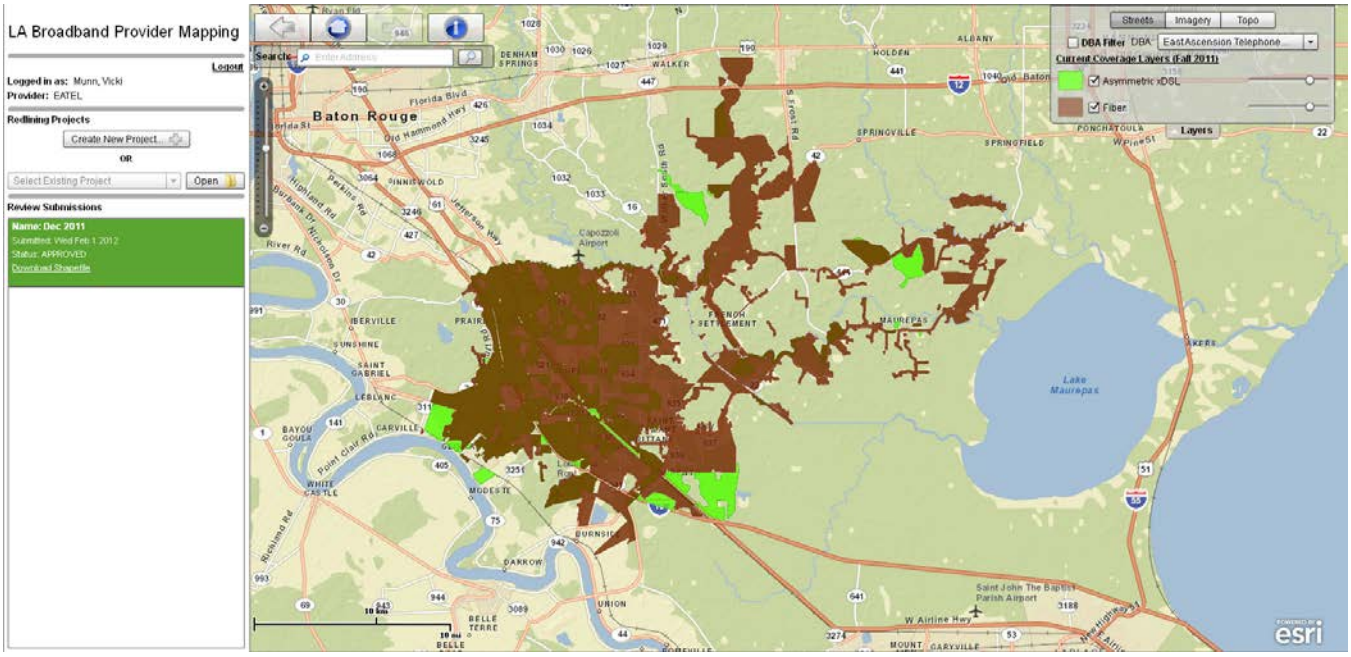


Figure 2 Provider Data Update Webportal – View/Edit Coverage Map Environment

Broadband Outreach Tracker Application

The Tracker application (Figure 3) is utilized to collect all correspondence with Providers and feedback on the effectiveness of the outreach activities by tracking items such as:

- The number and content of incoming e-mails and letters submitted from the Providers
- The number and source of comments, questions, and suggestions made by Providers
- The number and source of comments, questions, and suggestions made by attendees at Provider meetings and conference calls
- Provider contact information and data submittal status.

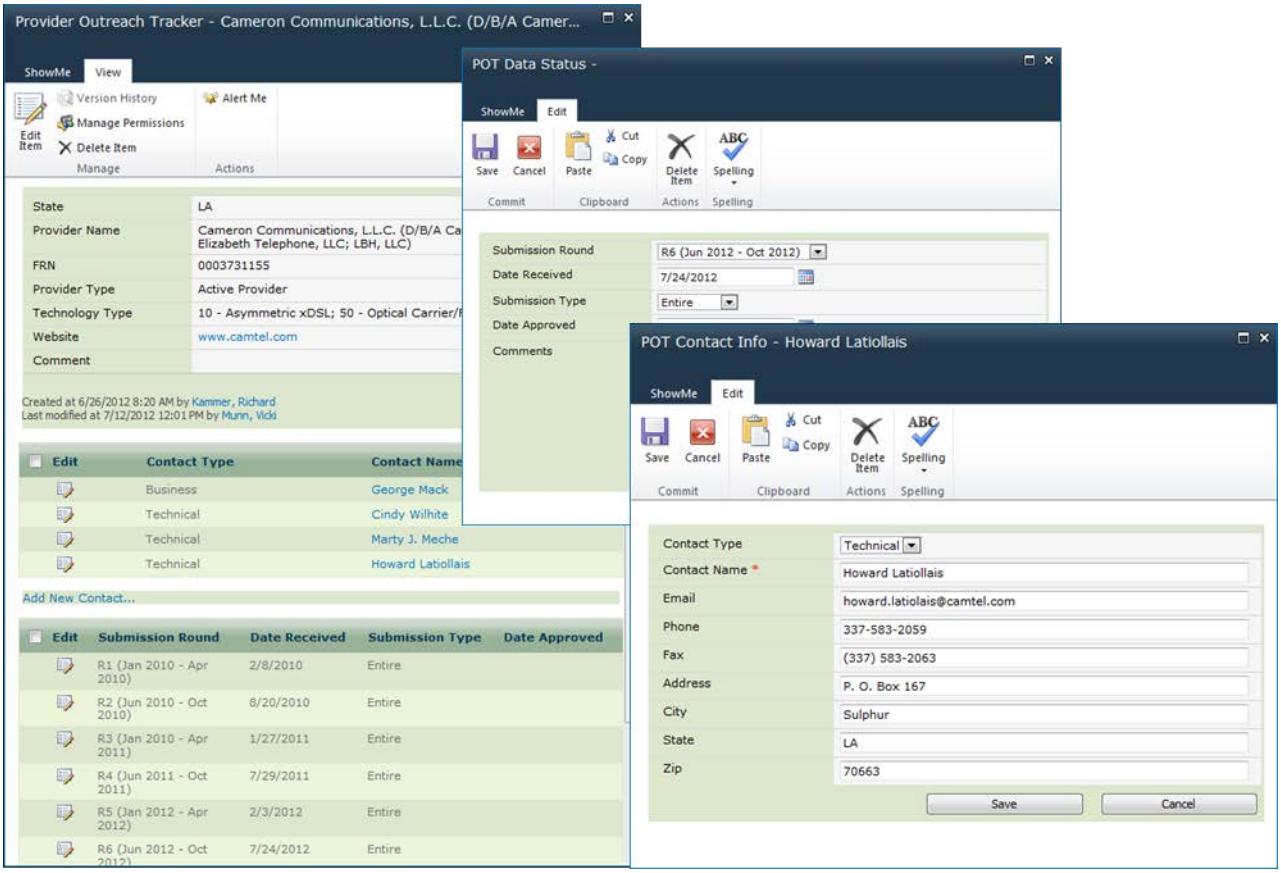


Figure 3 Broadband Outreach Tracker

Provider Submittal Validation

When a data submittal is received from a broadband service provider it is updated in the Broadband Outreach Tracker and run through an initial validation process to assure that it meets the submittal guidelines.

Validation Checklist

The following items are part of this initial data validation process:

- Verify the provider Transmittal Letter is complete and matches submitted data
- Verify the file naming conventions
- Verify each file is machine readable
- Verify data is in the correct GIS or Tabular format/file type
- Verify each field is populated and no empty or NULL values are present for mandatory fields
- Verify all ID (record number points) are unique within the submittal
- Verify all attribute data is formatted according to the submittal guidelines
- Verify topology for all geospatial submissions
- Verify Metadata for all submissions

- Verify the required contact information is included
- Verify adherence to Data Submittal Guidelines (see http://www.broadband.la.gov/lbi_providers.asp to access Data Submittal Guidelines)

Broadband Service Availability (at least one)

- Individual Street Addresses (Sec 3.1 & 4.1)
- Census Blocks < 2 sq mi (3.3 & 4.3)
- Street Segments for Census Blocks > 2 sq mi (3.2 & 4.2)
- Service Overview (Sec 3.4 & 4.4)
- Polygonal Boundary Area(s) (Sec 3.8 & 4.8)

Middle-mile Points (Sec 3.5 & 4.5)

Community Anchor Institutions (Sec 3.7 & 4.7)

Last Mile Connection Points (Sec 3.6 & 4.6)

WISP Antennas (Sec 4.9)

Data Usability Determination

The validation results are evaluated by the outreach and aggregation persons to determine the usability of the data. If the data meets the submission specifications, it is forwarded on for data aggregation. If it is determined to be unusable, it is returned to the provider for resolution. If the data can be manipulated to get it into a usable format, it is manipulated as required, and then forwarded on for data aggregation.

SBI Data Development

Data from the providers may be submitted in various formats as defined in the Data Submittal Guidelines, or in some cases unspecified formats may be accepted to help facilitate provider participation. Depending on the format of the submitted data, it is processed through one of the following processes to upgrade it to the NTIA SBI data standards.

Spatial Data

After validation and any required manipulation of any spatial data submitted by the providers, it is georeferenced and simply loaded into the appropriate NTIA geodatabase feature class.

Address Data Geocoding

If not already in the standard address point template, the provider tabular address data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. ArcGIS geocoding tools are then utilized geospatially locate the address points for the tabular records. Interactive address

rematching is performed against two additional street centerline datasets as needed to increase geocoding matching results. The NTIA deliverable is the geocoded address point geodatabase table. The geocoded address points are also subsequently aggregated to the census block or road segment feature class for public web map display.

Census Block Aggregation

If not already in the standard census block template, the provider tabular census block data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. The provider tabular census block records are then joined to the geodatabase 2010 U.S. Census Block. This join is performed as many times as necessary for multiple Trans Tech values for each Provider/Census Block combination. The NTIA deliverable is the census block geodatabase table.

If the list of census blocks contains blocks > 2 sq. miles then these blocks are used to select all the 2010 U.S. Census TIGER centerlines that intersect those blocks. The Census Block record data is aggregated to each Road Segment within the Census Block. This process is performed as many times as necessary for multiple Trans Tech values for each Provider/Census Block combination.

Road Segment Aggregation

If not already in the standard road segment template, the provider road segment data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. If the provider submittal included graphic centerline segments, these are migrated into the delivery geodatabase along with the linked attribute records. If the provider submittal was tabular road segment records only, they are then joined to the geodatabase 2010 U.S. Census TIGER centerline feature class. This join is performed as many times as necessary for multiple Trans Tech values for each Provider/Road Segment combination. The NTIA deliverable is the road segment geodatabase table.

If the provider road segment data lie within census blocks <= 2 sq. miles then the road segment data is aggregated to the census block. This process is performed as many times as necessary for multiple Trans Tech values for each Provider/Road Segment combination. The NTIA deliverable is the road segment geodatabase table.

Overview Data Aggregation

Provider Service Availability Areas submitted for entire county areas are loaded into the NTIA geodatabase Overview table. If not already in the standard template, the provider data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. The Provider Overview records are then joined to the geodatabase 2010 U.S. Census County feature class. This join is performed as many times as necessary for multiple Trans Tech values for each Provider/County Area combination.

Polygonal Boundary Aggregation/Integration

Providers submitting polygonal service area data are handled in two ways. Wireline Provider data is aggregated to the census block feature class for areas where census blocks <= 2 sq. mi., or road segment feature class for

areas where census blocks > 2 sq. mi. Wireless Provider Service Availability Areas submitted by polygonal area are simply loaded into the NTIA geodatabase Poly_Bndry feature class.

Wireline Provider

The polygonal data is georeferenced and loaded into the Poly_Bndry feature class. The polygon is then attributed, manually if necessary. Depending on the area, census blocks < or => 2 sq. mi., a selection set of either census blocks or road segments that intersect the polygon boundary is created. The attributed polygon boundary is then joined with census blocks or road segments table to attribute accordingly. This join is performed as many times as necessary for multiple Trans Tech values for each Provider/County Area combination. The NTIA deliverable is the census block or road segment geodatabase table.

Wireless Provider

The polygonal data is georeferenced and loaded into the Poly_Bndry feature class. The polygon is then attributed, manually if necessary. Multiple Poly_Bndry records are created for multiple Trans Tech values for each Provider. The NTIA deliverable is the polygon boundary geodatabase table.

Middle/Last Mile Data Integration

If not already in the standard template, the data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. The point features are geo-located utilizing the lat/long information provided. The NTIA deliverable is the middle or last mile geodatabase table.

Community Anchor Institution Integration

Providers supplied some Community Anchor Institution (CAI) data with the data submittals. But the majority of the data was collected from existing GIS Layers from previous studies and commercial data packages.

Provider CAIs

If not already in the standard template, the data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. The point features are geo-located utilizing the lat/long information provided. Address data is used to geocode locations only when Lat/Long data is not provided.

State CAIs

CAI shapefiles were downloaded from the commercial data packages. The shapefiles were then exported to the NTIA geodatabase CAI feature class. Various sources for obtaining broadband information for the CAIs were utilized including previous broadband studies.

USAC –CAI Web Scraping

To enhance the CAI inventory, a web scraping tool has been developed to automatically query the USAC public website, http://www.slforms.universalservice.org/DRT/Default.aspx, in a batch mode and extract school and library CAI data for Pennsylvania. This extracted information supplements the CAI data collected by the other methods.

Typical Speeds from Other Sources

Because not all providers are submitting the typical speed attribution with their data, a method to fill in the missing information has been developed using other sources. The method utilizes speed test data supplied through the FCC speed test information as well as from other speed test data that we are independently collecting. Business rules have been established so quality and realistic typical speeds are produced. The end result is a more complete data submittal to NTIA.

Propagation Modeling

Fixed wireless broadband transmission is a diverse technology. Service may be transmitted over licensed and unlicensed spectrum, and delivered by larger corporate or smaller LLC business entities, many of which serve rural areas of the State. This diversity has resulted in varying levels of SBI participation including Providers that have:

- participated,
- refused to participate,
- wished to participate but lack adequate capabilities and/or tools, or
- supplied data of marginal accuracy

The NTIA's supplemental grant funding has provided the means to generate propagation models to supplement and validate the above scenarios. In addition, the NTIA has identified fixed wireless service coverages with unusual shapes for state grantee analysis.

To facilitate development of propagation mapping, additional tower/antenna information is being requested from fixed wireless broadband providers. For those providers not responding to requests for required tower/antenna information, an attempt is made to gather the information through 3rd party sources and field investigation. The Provider, 3rd party and/or field data is processed using Terrain Analysis Package (TAP) software to develop propagation models. Maps of the resultant propagation study are sent to the fixed wireless providers for their feedback on the propagation model produced for their company.

Data Verification Summary

Louisiana's broadband mapping project employs a multi-prong approach to ensure the provider data is accurate and complete.

In summary, the project employs the following validation methodologies and resources:

- Provider Validation
- Data Validation via Market Intelligence Sources
- Data Validation Using State Supplied Data Points
- Field Validation
- Wireless Coverage Analysis
- Topology Validation

- Automated Validation Processing
- Confidence Level/Statistical Modeling
- SBDD Check Submission
- Stakeholder Validation

The remainder of this verification section describes the various methods in greater detail.

Provider Validation

After data development, service availability maps are generated and submitted to the providers to validate their mapping results. This provides a "sign off" on the interpretation of the submitted data and extends the outreach efforts by providing a visual representation of the data to be delivered to the State and the NTIA.

Types of Provider Maps

Provider maps generally consist of the following types.

Outreach Maps

Often, providers will send data which does not contain all the information needed for a NTIA compliant dataset. In such cases, as an aid to the outreach communication, it may be necessary to produce a map to help the provider locate their service area or verify data they have provided. These maps may take many forms, but generally are of two types:

- General Location Maps – these maps are often produced when the provider does not have a list of address or other standard submittal data and needs help defining their service area. A typical map will show counties, major roads, and towns of the general area the provider has stated as their service area. The intent of the map is to give the provider a way to markup or delineate their service area. If a provider has not provided required attribute information such as Technology of Transmission, Speed Data, etc. then it may be necessary to add a visual clue to this data like an information stamp on the map that they can easily fill out. If the provider sends the map back with a service area boundary, this can then be digitized and sent back to the provider for verification.

- Verification of Provider Supplied Boundaries – these maps are produced when the provider has sent service area boundary information which is confusing or otherwise unclear. Often these are produced when providers send CAD maps, hand drawn maps that need digitization, or lists of zip codes or counties served. A typical map will place the interpreted boundary over a location map so the provider can verify the service area. As with the General Location Map, information stamps or other visual clues may be placed on the map.

Initial Verification Maps

Once the provider data has been processed and the census block and road segment feature classes created, an Initial Verification Map (Figure 4) is produced to give the provider a visual representation of their service area by census block. These maps enable the provider to verify their service area and make changes if necessary. Initial Verification Maps are produced using a set of standards and produced at the highest resolution necessary to

convey the map information to the provider. Initial Verification Maps are also produced for Wireless Polygon areas.

Detailed Verification Maps

Providers who have questions about their service areas may request additional information to help clarify issues. In these cases it may be necessary to create a Detailed Verification Map to highlight the areas in question. Detailed Verification Maps provide the same information as Initial Verification Maps only at a higher resolution. Several maps may be needed to accurately portray an area in question.

Revised Maps

Revised maps take two forms:

- Initial or Detailed Verification Maps which have been annotated or marked-up by the provider
- Outreach produced Initial or Detailed Verification Maps incorporating provider changes

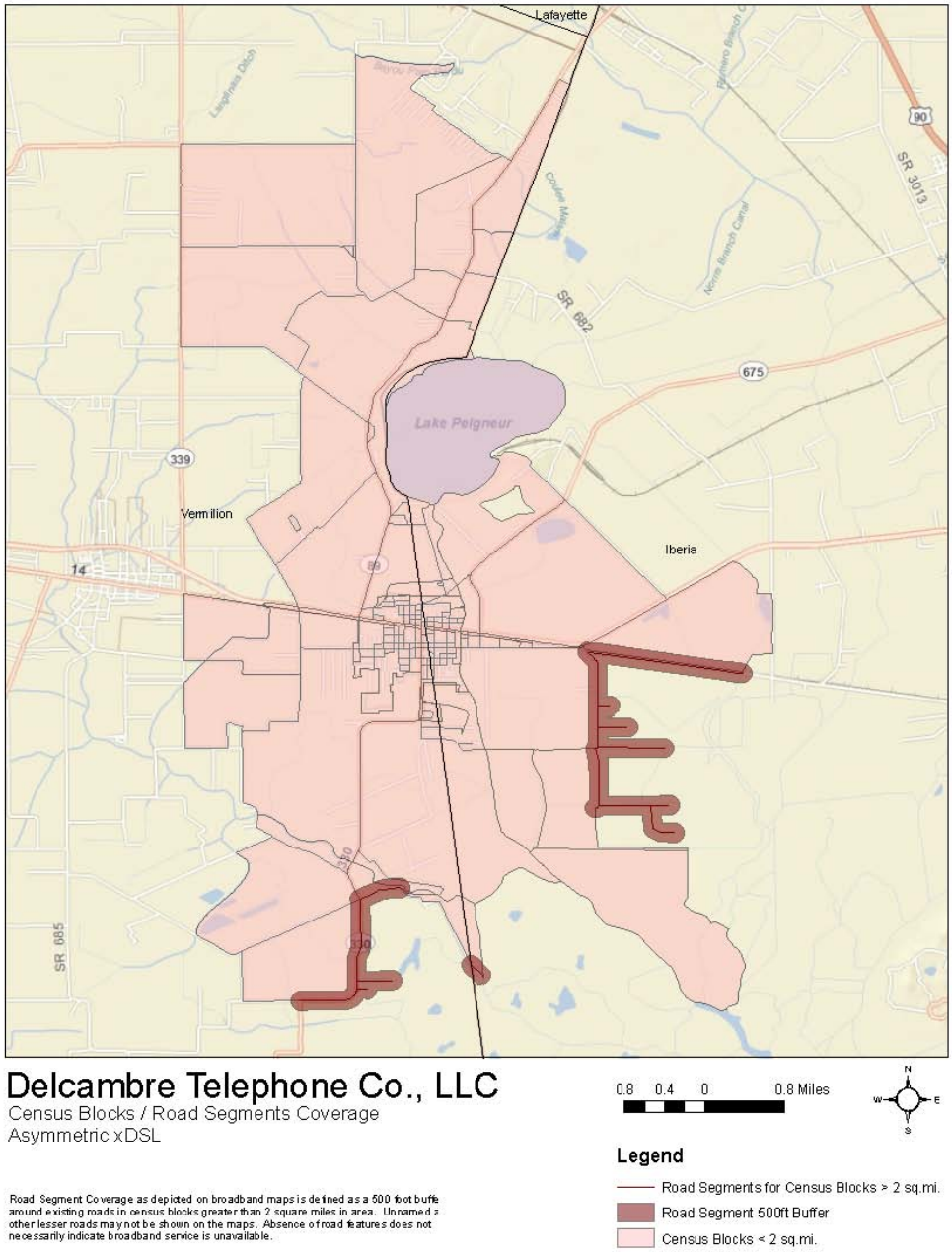


Figure 4 Provider Map

Data Validation

A critical component of the project is the validation of the data submitted by the broadband service providers. Data from various sources, as described in more detail in the following sections, is utilized to develop a level of confidence in the data received from the broadband providers.

Validation Data Set Collection and Development

This validation process employs data sets developed or acquired from different sources as described in the following sections.

Provider Feedback Loop: Maps of completed provider service areas and data are furnished back to the providers for confirmation of the processed/aggregated information. Feedback is integrated into the each Provider's dataset.

Broadband Market Analysis (BMA) Wireline Market Intelligence Data: Data is extracted from internal and commercial databases defining geographic service areas of telephone and cable companies and locations of central office (CO) switches and areas upgraded with fiber. The geographic areas are overlaid with Census demographic data on housing unit counts and density. The areas are then modified based on standard business practices for conducting service build-out and offering broadband service relative to housing density and other variables, such as distance from CO and other infrastructure elements, type of cable franchise (e.g., Census Place vs. Unincorporated County) This represents the first pass conservative estimate of coverage.

The above methods and data sources are supplemented by other data sources and methodologies, including: 1) connectivity data points acquired from InfoUSA that include ISP and type of connection (e.g., DSL, cable modem, dial-up, wireless, fiber) providing Internet service to specific geo-coded (i.e., by Latitude and Longitude) residential addresses; 2) web-based and telephone research, including address-level service-availability queries of web sites operated by service providers and independent entities. This multi-sourced MBA dataset is used as a validation source for provider service area coverage, Technology of Transmission, and Speed.

American Roamer Wireless Market Intelligence Data: Commercially available dataset used as an independent source to verify information submitted by Providers of wireless broadband service. This dataset is used as a validation source for provider service area coverage.

Speed Test: Visitors to the LA Broadband Mapping website are requested to take a speed test that measures downstream and upstream speeds.

Prior Broadband Mapping: Statewide coverage areas for Cable, DSL, and Fixed Wireless providers that were aggregated as part of a previous broadband mapping effort for the State of Louisiana are used to validate against Provider submitted data. In addition to the service areas, the DSL and Fixed Wireless layers contain general speed information that can be compared against Provider submitted data.

FCC Speed Test: The FCC speed test data includes the IP addresses for each specific speed test conducted. This IP address is queried against a web search engine to determine the Provider assigned to that address and is used as a validation source for provider service coverage and typical speeds.

Field Data Acquisition: Broadband technicians visited a sampling of census block locations to gather broadband data to be used for validation. The following criteria were taken into account when developing the census block sampling dataset:

- urban vs. rural census block characteristic
- censes block grouping
- land vs. water census block characteristic

The overarching mission of the Federal broadband stimulus program is to expand Broadband service to areas that are currently unserved and underserved. Also, the market intelligence validation sources typically represent some rural, but more urban areas. Thus, our field data collection efforts were targeted more towards the rural areas; split 90% rural, 10% urban.

Additionally, a study by Penn State University (Glasmeier 2002) notes that a large number of census block groups typically fit within any given cable or telephone company service areas. Therefore, our field sample was also based on selection of one census block per block group. The selected census block also had greater than 50% land area, versus water. There are a total of 3, 512 census block groups statewide. Using a statistical sample size calculator based upon the number of block groups in the state and +/- 4% margin of error at a 95% confidence level, the sample size is 557 census block locations (Figure 5).

For the 557 census blocks that were visited, 3257 individual wired/wireless data elements were recorded and 3410 pictures were taken at those locations. This field collected dataset is used as a validation source primarily for wireline and wireless technology of transmission and middle mile, and for wireless speed.

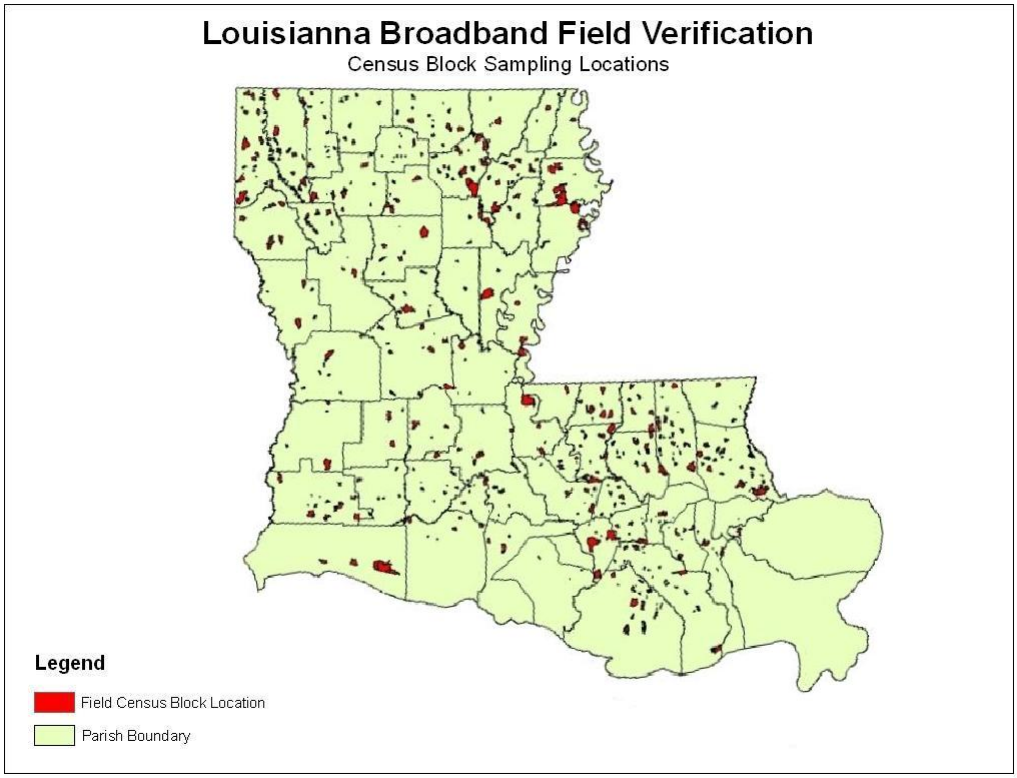


Figure 5 Field Verification Sampling Locations

For each census block in the sample set, broadband technicians collected data using Panasonic Toughbook computers, loaded with MapPoint mapping software, and a customized Microsoft Access data collection form with the ability to automatically import GPS coordinates. The sample census blocks were pre-loaded and directly accessible from MapPoint. Two types of data collection were conducted; infrastructure observation and wireless speed testing; and the results were recorded and linked to the corresponding field location coordinates within the designated sample census block. The information collected by the field broadband technicians includes:

Wireline:

- GPS coordinates
- circuit infrastructure feeding the area (copper, fiber, cable)
- collect site pictures

Wireless:

- GPS coordinates
- internet speed test

This field collected dataset is used as a validation source primarily for wireline and wireless technology of transmission and middle mile, and for wireless speed.

Provider Data Validation Process

Provider Feedback Loop: Feedback received from the providers is visually inspected and integrated directly into the mapping GIS database.

Service Area Validation Data: The BMA wireline service area data is tabular and contains a separate record for each provider/technology of transmission combination with an associated census block or TIGER road segment, depending on the whether the size of the census block area (=/< or > 2 sq. mi.). This data is exported into an ArcGIS data format. The American Roamer and Prior Mapping service area data is already in and ArcGIS data format. The validation data is then joined to the Provider service area data by census block or TIGER road segment ID. Any database records in the Provider or Validation tables that cannot be joined are output to a separate layer that indicates the areas of discrepancy between the two datasets. The joined tables are then queried to detect any speed discrepancies which are also output to a separate discrepancy layer.

Field Validation Data: The field data are also collected in tabular database format, and represent a specific lat/long spatial location for each record. This data is also exported into an ArcGIS data format, joined to the provider data, queried to validate pertinent attribution. Again, records not joined and or with detected attribution discrepancies are output to separate GIS layers.

Topology: The ArcGIS Validate Topology Tool is used to flag any topology issues in the broadband data. Flagged issues are reviewed to identify false positives and update true errors as required.

SBI Check Submission: The NTIA-provided SBI Check Submission tool is utilized to validate that the deliverable broadband data is consistent with the business logic rules set forth by the NTIA and a passing receipt is provided with the data submittal to NTIA.

Stakeholder Feedback: The state broadband mapping website includes a feedback function. Comments received from stakeholders are reviewed and used to validate provider data submissions.

Validation and Confidence Level Reporting

To facilitate validation and confidence level reporting, Baker deployed a validation application called Statistical Evaluation and Assessment System (SEAS), shown in Figure 6, which automatically compares the multiple independent validation datasets against the broadband service providers' supplied information. The SEAS application uses statistical methodologies to report the confidence level in the spatial and attribute accuracy of the information. Appendix B shows the validation workflow.

The SEAS comparison is a three-part validation process:

1. Comparison of the collected validation source against the aggregated broadband provider data.
2. Match percentage calculation for each provider reported in the DataPackage.xls, "Provider Table" tab, "Comments" column.
3. Confidence score calculation displayed on the state broadband website.

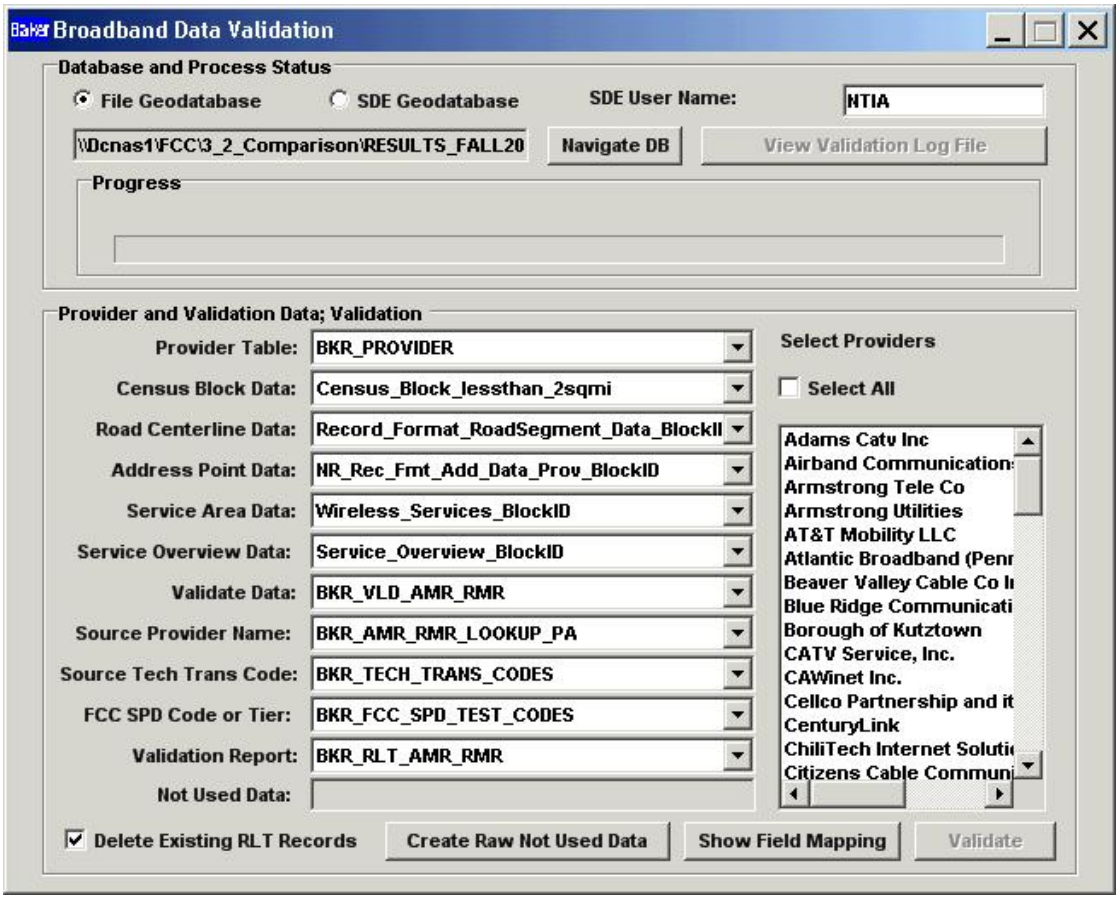


Figure 6 Statistical Evaluation and Assessment System (SEAS)

After completing all validation data source collections, SEAS is used to automatically compare the multiple validation datasets against the aggregated broadband data which came from the providers. Through the SEAS accumulation table, it produces a match percentage per broadband service record based upon the number of matches that record has against each validation source. The matched percentage for each record is the result of the total count of the matched validations for the record divided by the total validation source being compared against the record. A validation confidence rating/score is then assigned on a scale of 1 to 5 based upon the percentage of validation source matches as per the following score results:

- 1 Star = 0% - 19% Match
- 2 Stars = 20% - 39% Match
- 3 Stars = 40% - 59% Match
- 4 Stars = 60% = 79% Match
- 5 Stars = 80% - 100% Match
- "No Analytics" = No validation source available for that provider

The State's public broadband mapping website (http://www.broadband.la.gov/lbi_providers.asp) is updated with the confidence level results at the record level based upon the queried geographic location and the following is an example of this representation.

Provider Name	Transmission Technology	Max Download Speed	Max Upload Speed	Confidence Score
AT&T Mobility	Mobile Wireless	Greater than or e…	Greater than or e…	
Verizon	Asymmetric xDSL	Greater than or e…	Greater than or e…	NO ANALYTICS
Comcast	Cable Modem – Other	Greater than or e…	Greater than or e…	

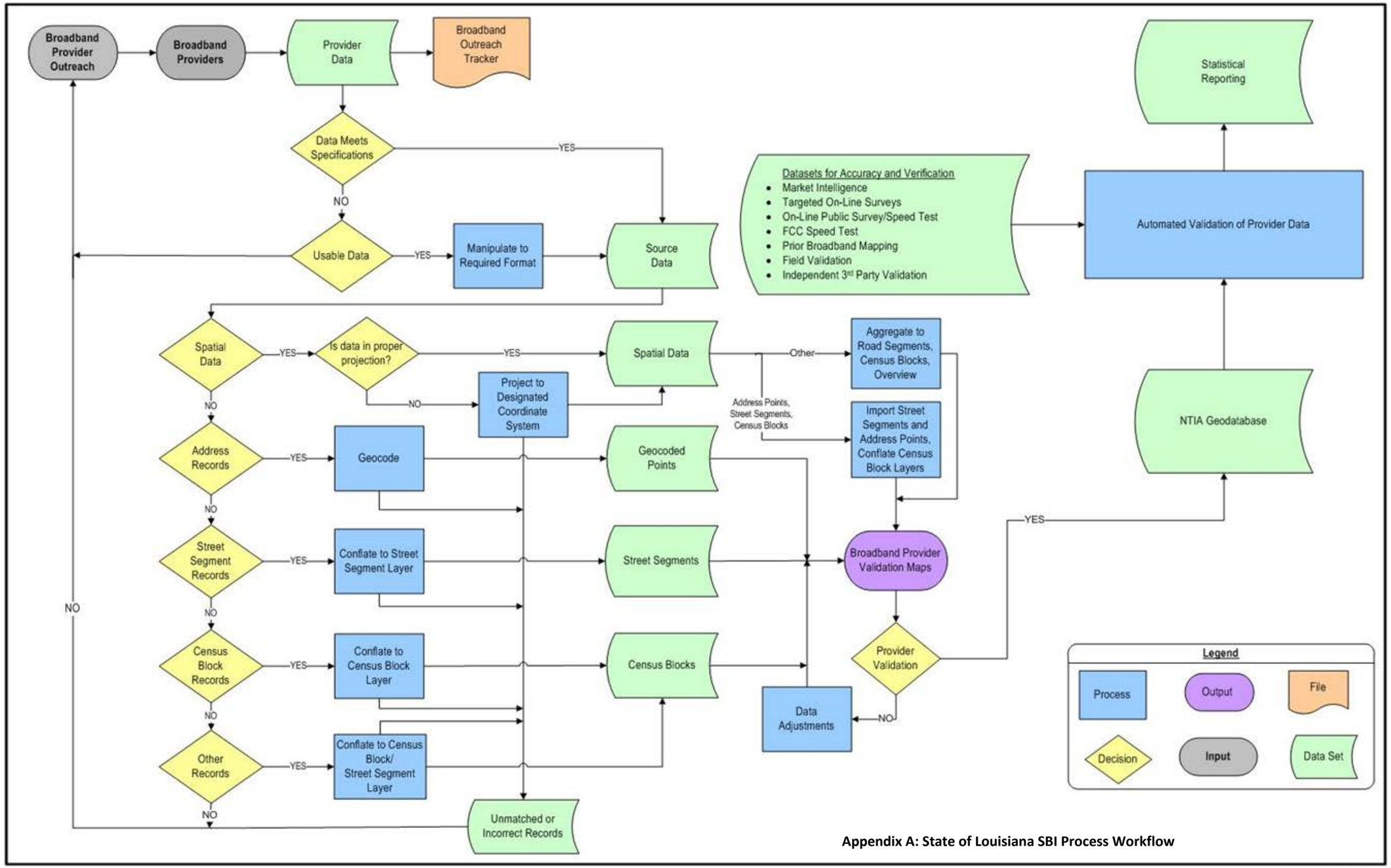
The matched percentage for the records for each provider are summarized and then divided by the total count of the records to create the final matched percentage for the specific provider. These percentages are included in DataPackage.xls on the Provider Table tab in the Comments column.

Low Confidence Provider Feedback

Provider data which is assigned a low confidence (1 or 2 stars) through the SEAS process is communicated back to the provider through a feedback loop. Generally, the low confidence feedback and reconciliation is a continuous refinement process and will occur between update cycles. The goal is to provide this feedback through the Provider Data Update Webportal via a web connection that is available and rolled out to providers in January 2012.

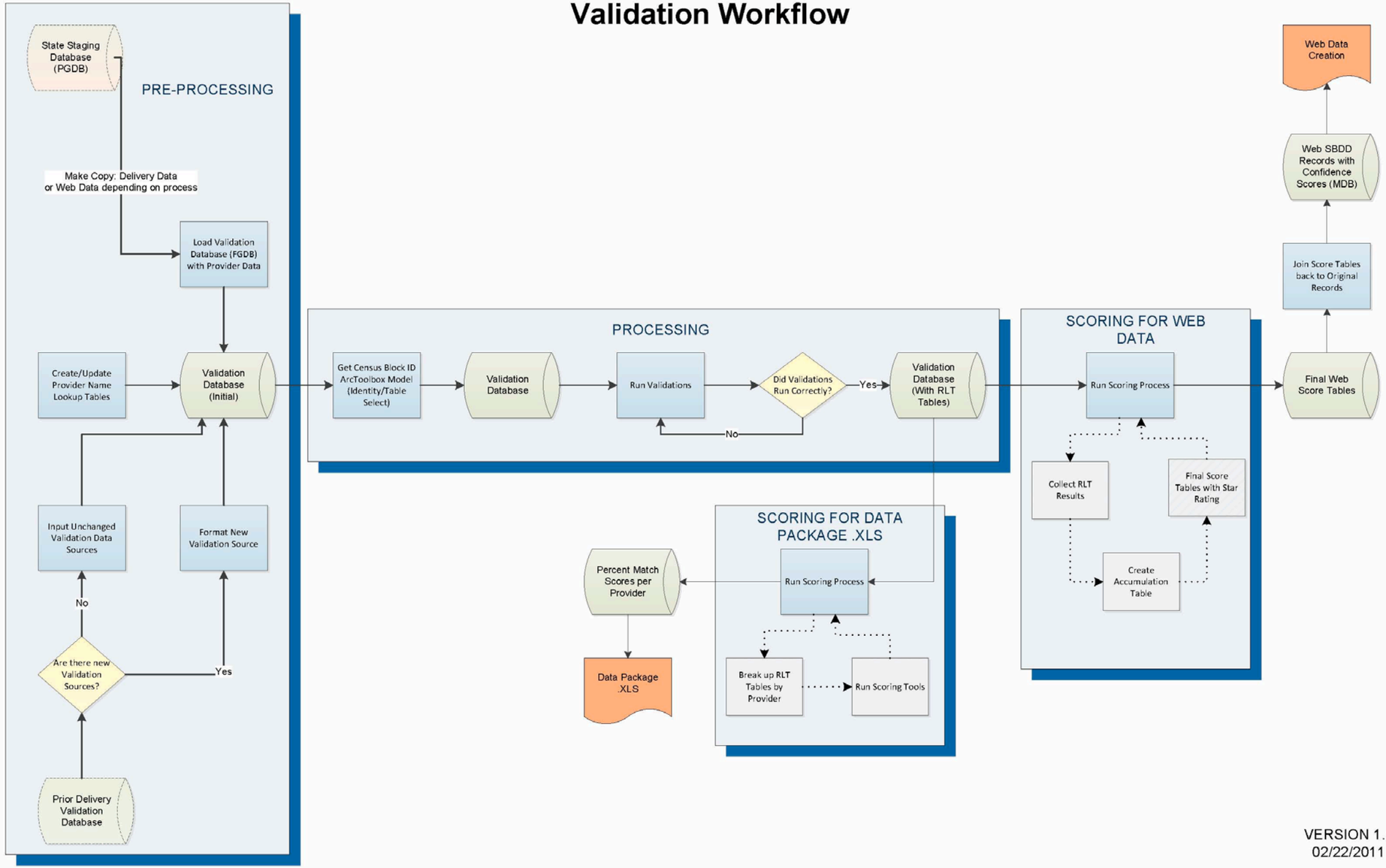
Changes and Corrections Documentation

With each semi-annual NTIA data submittal, changes and corrections documentation is provided. Significant changes in a provider's status or data, corrections to previously supplied data, providers supplying data for the first time, etc. are specified by Provider name in the Changes and Corrections document.



Appendix A: State of Louisiana SBI Process Workflow

State Broadband Data Validation Workflow



VERSION 1.1
02/22/2011

Appendix C: Master Outreach List

Filing Company DBA	Filing Company Name	Status
Trust Cable TV, Inc.		Affiliate of Bailey Cable
Cypress Communications Operating Company, LLC		Affiliate of Broadvox Communications
Command Conect, LLC		Affiliate of Cameron Communications
Interlink Communications Partners LLC		Affiliate of Charter Communications
MediaCom		Affiliate of CommuniComm Services
TriParish.net		Affiliate of Computer Sales and Services, Inc.
Plaquemines Cablevision		Affiliate of Etan Industries, Inc.
Bayou Internet Inc.		Affiliate of Integrated Data Systems
DSLnet Communications, LLC		Affiliate of MegaPath
Louisiana Unwired, LLC		Affiliate of Sprint
Wirelessco, L.P.		Affiliate of Sprint
Alltel Corporation		Affiliate of Verizon
360networks		Not a Broadband Provider or Reseller
AccessCom, Inc.		Not a Broadband Provider or Reseller
BLC Management LLC of Tennessee D/B/A Angles Communication Solutions d/b/a Mexicall Communications		Not a Broadband Provider or Reseller
Broadcore, Inc.		Not a Broadband Provider or Reseller
BroadPoint, Inc.		Not a Broadband Provider or Reseller
Catcomm Internet Services, LLC		Not a Broadband Provider or Reseller
Crawfish Net / WorldPace Internet		Not a Broadband Provider or Reseller
CS Wireless LLC		Not a Broadband Provider or Reseller
ERF Wireless, Inc.		Not a Broadband Provider or Reseller
Etex Communications		Not a Broadband Provider or Reseller
EZNETLA, L.L.C.		Not a Broadband Provider or Reseller
First Choice Technology of Louisiana, LLC		Not a Broadband Provider or Reseller
Galaxy Cable Inc.		Not a Broadband Provider or Reseller
Global Crossing Telecommunications, Inc.		Not a Broadband Provider or Reseller
Ground Control Systems, Inc.		Not a Broadband Provider or Reseller
Gulf Coast Broadband		Not a Broadband Provider or Reseller
LightEdge Solutions, Inc.		Not a Broadband Provider or Reseller
LocalUSA		Not a Broadband Provider or Reseller
McGraw Communications, Inc.		Not a Broadband Provider or Reseller
Metro PCS		Not a Broadband Provider or Reseller

Filing Company DBA	Filing Company Name	Status
Mitel NetSolutions, Inc.		Not a Broadband Provider or Reseller
Network USA, LLC		Not a Broadband Provider or Reseller
NextGen Communications, Inc.		Not a Broadband Provider or Reseller
Petrocom License Corporation		Not a Broadband Provider or Reseller
Pleasant Vision, Inc.		Not a Broadband Provider or Reseller
Public Service Communications, Inc.		Not a Broadband Provider or Reseller
Qualcomm Incorporated		Not a Broadband Provider or Reseller
Qwest Communications Company, LLC		Not a Broadband Provider or Reseller
Red River Cable TV Co, Inc.		Not a Broadband Provider or Reseller
Service One Cable TV		Not a Broadband Provider or Reseller
Southern Light of Louisiana, LLC		Not a Broadband Provider or Reseller
Stratos Offshore Service Company		Not a Broadband Provider or Reseller
TeleConex, Inc.		Not a Broadband Provider or Reseller
Telepak Networks, Inc.		Not a Broadband Provider or Reseller
The Other Phone Company, Inc. D/B/A Access One Communications		Not a Broadband Provider or Reseller
Toly Digital Networks, Inc.		Not a Broadband Provider or Reseller
TX-11 Newco LLC		Not a Broadband Provider or Reseller
US LEC Communications Inc. D/B/A PAETEC		Not a Broadband Provider or Reseller
Verizon Business Global LLC D/B/A Verizon Business		Not a Broadband Provider or Reseller
Wave2Wave Communications Inc.		Not a Broadband Provider or Reseller
Wow Technologies, Inc.		Not a Broadband Provider or Reseller
Alliance Communications Network		Potential
Broadview Networks Holdings, Inc.		Potential
Broadvox, LLC		Potential
Ernest Communications, Inc.		Potential
Matrix Telecom, Inc.		Potential
SkyRider Communications, Inc.		Potential
Superior Wireless		Potential
The Bayou Telephone Company, Inc.		Potential
Windstream		Potential
XO Communications Services, Inc.		Potential
Acadania Wireless		Provider
AllensTV	AllensTV	Provider
American Warrior Network	Communication Construction Services	Provider
AT&T Corp, Inc.	AT&T Corp, Inc.	Provider
AT&T Louisiana	BellSouth Telecommunications, Inc.	Provider
AT&T Mobility LLC	AT&T Mobility LLC	Provider
Audubon Cablevision	Bailey Cable TV, Inc.	Provider

Filing Company DBA	Filing Company Name	Status
Bayou Cable Inc	Bayou Cable Inc.	Provider
Bluebird Wireless Broadband Services, LLC		Provider
Buford Media Group		Provider
C Spire Wireless		Provider
Cable One	Cable One	Provider
Cameron Communications	Cameron Telephone Company, LLC	Provider
Cameron Communications	Elizabeth Telephone Company, LLC	Provider
Cameron Communications	LBH, LLC	Provider
Campti-Pleasant Hill Telephone Co., Inc.	Campti-Pleasant Hill Telephone Co., Inc.	Provider
CenturyLink	CenturyTel, Inc.	Provider
Charter Communications	Chater Communications	Provider
Clear Choice Communications	Clear Choice Communications	Provider
CMA Communications	Etan Industries, Inc.	Provider
Cogent Communications, Inc.	Cogent Communications, Inc.	Provider
Comcast	Comcast Cable Communications, LLC.	Provider
CommuniComm Services	James Cable	Provider
Computer Sales & Services, Inc.	Computer Sales & Services, Inc.	Provider
Conterra Broadband Services D/B/A DETEL		Provider
Cox Communications	CoxCom Inc.	Provider
CP-Tel Network Services	CP-Tel Network Services	Provider
Cricket Communications, Inc.	Leap Wireless International, Inc.	Provider
Delcambre Telephone Co., LLC	Delcambre Telephone Co., LLC	Provider
East Ascension Telephone Company LLC	EatelCorp Inc	Provider
Fidelity Communications	Cobridge Communications	Provider
Fulair Wireless	Fulair Wireless	Provider
Harbor Communications, LLC		Provider
HughesNet	Hughes Communications, Inc.	Provider
Hunt Telecom		Provider
Inetsouth (formerly Maximum Access, LLC)		Provider
Integrated Data Systems		Provider
Interactive E-Solutions		Provider
Kaplan Telephone Co	Kaplan Telephone Co., Inc.	Provider
Kayse Wireless		Provider
Kinetix Technologies	Kinetix Broadband, LLC	Provider
Kricket.net		Provider
Level 3 Communications, LLC	Level 3 Communications, LLC	Provider
LUS Fiber	Lafayette City-Parish Consolidated Government	Provider

Filing Company DBA	Filing Company Name	Status
Media III	CableSouth Media III, LLC	Provider
MegaPath Corporation	MegaPath Corporation	Provider
Nexus Systems, Inc.		Provider
NORTHEAST LOUISIANA TELEPHONE CO., INC.	NORTHEAST LOUISIANA TELEPHONE CO., INC.	Provider
PC One Cable LLC		Provider
Radio Communications Service	Gonthier, Inc.	Provider
Reserve Telecommunications	Reserve Long Distance Co.	Provider
Skycasters	Skycasters, LLC	Provider
Skycom1		Provider
Spillway Communications Inc.	Spillway Communications Inc.	Provider
Sprint	Sprint Nextel Corporation	Provider
Squire Creek Communications, LLC	Squire Creek Communications (SSL)	Provider
Star Communications	Star Telephone Company, Inc.	Provider
StarBand Communications Inc.	StarBand Communications Inc.	Provider
Suddenlink Communications	Cebridge Acquisition, LP	Provider
Suddenlink Communications	Classic Cable of Louisiana, LLC	Provider
T-Mobile	T-Mobile USA, Inc.	Provider
tw telecom of lousiana llc	tw telecom of lousiana llc	Provider
Verizon Wireless	Cellco Partnership and its Affiliated Entities	Provider
ViaSat, Inc. (fomerly WildBlue Communications, Inc.)		Provider
Vision Communications	SJI, LLC	Provider
Vision Communications	Vision Communications, LLC	Provider
Xfone USA, Inc.	Xfone USA, Inc.	Provider
Access Point, Inc.		Reseller
Birch Communications, Inc.		Reseller
BullsEye Telecom, Inc.		Reseller
COMTECH 21, LLC		Reseller
DeltaCom, Inc.		Reseller
Meriplex Communications, Ltd.		Reseller
Metropolitan Telecommunications Holding Company		Reseller
Network Telephone Corp. D/B/A Cavalier Business Communications		Reseller
New Edge Network, Inc.		Reseller
NuVox, Inc.		Reseller
Talk America Inc. D/B/A Cavalier Telephone and TV		Reseller
TEC of Jackson, Inc.		Reseller
Telefonica USA, Inc.		Reseller

Filing Company DBA	Filing Company Name	Status
Tennessee Telephone Service, LLC D/B/A Freedom Communications USA, LLC		Reseller
XPANCE Broadband, Ltd.		Reseller

Methodologies Used to Create and Validate Broadband Datasets For the April 2013 SBDD Submission

EXECUTIVE SUMMARY

Broadband data for Massachusetts was collected, integrated and verified by the Massachusetts Broadband Institute (MBI), a division of the Massachusetts Technology Collaborative (MTC). This data was prepared for the National Telecommunications and Information Administration (NTIA) as part of the State Broadband Data and Development (SBDD) grant program and will be displayed on the National Broadband Map. This data is current as of December 31, 2012 and will continue to be verified and updated to improve the quality and accuracy of the information to support MBI activities including adoption studies and last mile deployment planning.

About the MBI

The MBI is the central broadband entity for the Commonwealth of Massachusetts, created on August 4, 2008 when Governor Deval Patrick signed Chapter 231 of the Acts of 2008, *An Act Establishing and Funding the Massachusetts Broadband Institute* (the "Broadband Act"). The mission of the MBI is to extend affordable, robust high-speed Internet access to all homes, businesses, schools, libraries, medical facilities, government offices and other public places across our state.

The Broadband Act gives the MBI the authority to invest up to $40 million of state bond funds into broadband infrastructure. This bonding authority is structured as an "incentive fund" intended to stimulate private industry investments that will complement the MBI's public investments. The MBI is investing its funds in long-lived infrastructure assets, such as conduit, fiber-optic cable and wireless towers, which will lower the cost of entry for broadband providers and make it economically feasible for such firms to provide broadband access service to currently unserved residential, business and institutional customers. For more information about the MBI and its programs and activities, visit the web site at broadband.masstech.org.

Data Summary

The MBI has collected data for the 32 of 40 companies that meet the SBDD program definition of "broadband service provider" in Massachusetts. The complete list of potential providers also includes resellers and other providers that do not meet the SBDD definition as well as companies that filed FCC Form 477 but do not actually provide broadband service in MA. This list may be found in the "Broadband Providers in Massachusetts" section starting on page 13.

Provider Lists	# Providers
Potential providers in MA (from FCC Form 477 and other sources)	144
Verified as a provider in MA (including resellers and other providers that don't fit the NOFA definition of "provider"	91
Data obtained for or from the provider (included in the April 2013 data submission)	35

Data was acquired from 34 providers of residential and business broadband access in Massachusetts and created from the web site of 1 additional provider. Data transmission technologies in the datasets include asymmetric and symmetric DSL, other copper wireline, DOCSIS 3.0 and other cable, fiber optic, unlicensed fixed wireless, 3G and 4G mobile wireless and satellite technologies. This information was integrated and submitted to the NTIA in the following four datasets.

Dataset	# Providers	# Records
BB_Service_CensusBlock	18	414,502
BB_Service_RoadSegment	12	11,682
BB_Service_Wireless	16	31
BB_ConnectionPoint_MiddleMile	16	303

Information on broadband services at Community Anchor Institutions (CAIs) were collected by phone, email and web surveys. Approximately 20% of the CAIs participated in the survey, of which 83% subscribe to broadband services.

Dataset	# Institutions	# Records
BB_Service_CAInstitution	5,072	5,325

DATA DEVELOPMENT – GENERAL

Data development was performed using Esri ArcGIS 10.1 software.

Data Integration

Data were received from broadband service providers in varying formats and levels of detail. No two datasets were alike, which required a significant amount of manual review and editing to integrate the information into a common format. Although Excel and Shapefile templates were made available, very few datasets were received in the template formats and attributes were not always provided using the standardized coded values requested. In addition, attribute field names were inconsistent between datasets, contained spaces and special characters or were missing altogether. These differences prevented the use of automated data integration models to format and import data into standardized feature class templates.

All attributes were standardized so that the provider name, doing-business-as name and FCC registration numbers were consistent throughout the datasets and that attributes complied with valid value lists (e.g., for technology of transmission, spectrums used, maximum advertised and typical speeds, end user category, etc.).

Geocoding

Unless otherwise specified, address data was geocoded using street addresses and zip codes from NAVTEQ streets data, which was developed though a partnership between NAVTEQ and the

Massachusetts Office of Geographic Information (MassGIS) for increased geocoding accuracy and success rates for the State E911 data.

Data transfer model loading
The final datasets for each provider were appended and loaded into the SBDD transfer schema. Geometry and topology checks were performed a final time and the data were checked for conformance with SBDD database and business rules.

DATA DEVELOPMENT – WIRELINE AVAILABILITY

This section describes the methods used to create the following datasets representing wireline broadband availability (e.g., cable, xDSL, other copper wireline, fiber optic and other unclassified wireline services) by census block and/or road segment:

- BB_Service_CensusBlock and
- BB_Service_RoadSegment

The various wireline broadband availability data formats received include:

1. Non-geographically referenced CAD files containing cable or fiber strands;
2. Geographically referenced Shapefiles containing census block polygons or road segments;
3. Excel spreadsheets or delimited text files containing census block IDs
4. Excel spreadsheets or delimited text files containing individual street addresses;
5. Excel spreadsheets or delimited text files containing street address ranges
6. Written or verbal narratives of service areas; and
7. Excel spreadsheets containing maximum advertised speeds by US Census Bureau core based statistical area (CBSA) and rural statistical area (RSA).

For areas where census blocks are less than or equal to 2 square miles in area, a template containing 2010 census block polygon geography was used. Otherwise, a template was used containing line geography from 2010 TIGER/Line roads that intersect 2010 census blocks greater than 2 square miles in area. Associated attribute information included provider identification, technology of transmission and upload and download speeds.

Data Integration
The integration methods used, and described below, varied according to the source data format.

1. Integrating CAD strands: Cable strands submitted in CAD format were georeferenced to street centerlines and a 200 foot buffer was created from the strands. 2009 census blocks and 2009 TIGER/Line road segments (in census blocks greater than 2 square miles in area) that intersected the 200 foot buffer were classified as served and associated attribute information from tabular datasets or narratives were populated accordingly. These were later converted to 2010 census blocks and roads, as defined in method 4.

2. Integrating census block and road segment polygons: Data provided in Shapefile format required minor formatting of attribute field names and values to match the common schema.

   (a) The census block vintage (2000 or 2010) was determined by reviewing ID values and attributes were imported into the census block template.

   (b) If vector data was provided from a source other than TIGER/Line roads, a spatial intersection with a 200 foot buffer was performed to transfer attributes to the corresponding TIGER/Line road segments.

3. Integrating tabular data containing census block IDs: Tabular information relating to census blocks referenced either 2009 or 2010 census block data and was joined to the corresponding polygon geometry using the 15 or 16 character FIPS IDs. 2009 census block data were summarized and joined to the 2000 census block polygons using the first 15 characters of the FIPS ID while retaining the maximum advertised and typical speeds and other associated validation and data processing attributes. These were then converted to 2010 census blocks, as defined in method 4.

4. Converting to 2010 census blocks: Census blocks and associated attribute information were converted from 2000 to 2010 census blocks by performing a spatial overlay of the adjusted 2000 census blocks and the new 2010 census blocks. Attribute information was summarized by the 15 character GEO ID (i.e., FIPS ID) and statistics were calculated to carry over the appropriate attribute information (e.g. maximum advertised speeds), which were loaded back into a template containing the 2010 census block geometry.

5. Integrating tabular data containing individual street addresses: Tabular data containing individual street addresses, generally representing subscriber addresses, were geocoded using NAVTEQ streets data to generate point locations. 2010 census blocks and 2010 TIGER/Line road segments (in census blocks greater than 2 square miles in area) that intersect a 200 foot buffer of the points were classified as served. Associated attributes were also imported.

6. Integrating tabular data containing street address ranges: (a) If tabular data was based on 2010 TIGER/Line roads and included a TIGER line ID (TLID), the attributes were loaded into a template containing the TIGER/Line geometry by joining the TLIDs.

   (b) If tabular data was not based on TIGER/Line roads or did not have a means for creating a unique ID to link to the TIGER/Line data, the minimum, mean and maximum left and right street addresses were geocoded using NAVTEQ streets data to generate point locations. As with the individual street address methodology above, 2010 census blocks and 2010 TIGER/Line road segments (in census blocks greater than 2 square miles in area) that intersect a 200 foot buffer of the points were classified as served. Associated attributes were also imported.

7. Integrating narrative data: (a) Location information provided in narrative form, such as the names of streets served or unserved, were incorporated by classifying the qualifying road segments as served. A spatial intersection was then performed to classify any census blocks with area less than 2 square miles as served.

(b) Attribute information provided in narrative form generally applied to all records or an easily identifiable subset of records in a dataset and the standardized values were assigned to the appropriate field in batch.

8. Integrating spreadsheets containing speed by CBSA/RSA: The tabular data was joined to corresponding CBSA/RSA polygon geometry using the CBSA/RSA ID. Maximum advertised download and upload speed values were transferred to census block and road segment availability records from the CBSA/RSA polygon they are located within.

Data standardization
All information was imported into to 2010 census blocks and road segments. Records with download speeds below 768 kbps (i.e., that don't qualify as broadband service) were removed from the final dataset.

DATA DEVELOPMENT – WIRELESS AVAILABILITY

This section describes the methods used to create the following dataset representing wireless broadband availability (e.g., fixed and mobile wireless and satellite services) by service area:

- BB_Service_Wireless

The various wireless broadband availability data formats received include:

1. Geographically referenced Shapefiles or MapInfo files containing service area polygons;
2. Geographically referenced KML vector and raster files depicting service areas;
3. Non-geographically referenced PDF and JPG files depicting service area polygons;
4. Hard copy maps with hand-drawn service areas;
5. Excel spreadsheets containing street addresses; and
6. Emails and technical documents containing tower and signal specifications.

Associated attribute information included provider identification, technology of transmission, wireless spectrums used and upload and download speeds. In some cases, attributes were provided in a separate tabular or narrative form or had to be acquired from the provider's web site. If providers offered more than one spectrum, a separate feature was created for each unique provider and spectrum combination.

Data Integration
Data integration methods used, and described below, varied according to the source data format.

1. Integrating service area polygons: Data provided in vector format required minor processing to fix geometry errors and create separate polygons for unique provider and spectrum combinations. Polygons less than 0.125 square miles, except for the islands along the Massachusetts coastline, were removed and the remaining polygons were dissolved to create a single feature for each unique provider and spectrum combination. Attribute field names

and values were created, formatted and/or populated from tabular or narrative form to match the standardized template format.

2. Integrating service area raster images: Propagation model outputs provided as KML raster images were imported into the GIS system; however, the geographic reference information was not able to be preserved. The imported raster images were georeferenced in the GIS by matching the intersections of propagation area boundaries and roads in Google Earth. Once georeferenced, the raster images were converted to polygons, then tagged with and aggregated by the associated tower ID and spectrum information to create service areas polygons for each propagation model. Additional associated attribute values were populated from information provided in narrative form.

3. Integrating static maps: The PDF and JPG maps containing wireless access points and service area buffers were georeferenced using known locations, such as road intersections. Service areas were digitized or recreated from buffered points on the georeferenced maps. Individual service areas were tagged with spectrum information and aggregated into a single service area for the provider and spectrum combination. Additional associated attribute values were populated from information provided in narrative form or from providers' web sites and the resulting service area boundaries received confidence score of 1.

4. Integrating hard copy maps: Hard copy maps containing shaded service areas were reproduced by digitizing boundaries based on known map locations, such as road intersections. Associated attribute values were populated from information provided in narrative form and the resulting service area boundaries received confidence score of 1.

5. Using tabular data containing street addresses: Tabular data containing individual street addresses, representing subscriber addresses or addresses where service was determine not to be available, were geocoded using NAVTEQ streets data to generate point locations. These locations were compared to service areas and propagation models to verify boundaries.

6. Modeling with tower and signal specifications: Wireless tower and signal specifications (e.g., latitude, longitude, cell site height, cell site frequency and effective radiated power) were used as input parameters in SPLAT! radio frequency signal propagation, loss, and terrain analysis software. Service area boundaries were derived from the received power contours in the resulting propagation models. Additional associated attribute values were populated from information provided in narrative form.

7. Integrating online service maps: Wireless service coverage maps downloaded as images from some providers' web sites, georeferenced using roads and other map features and classified by colors into 2 categories (broadband service and all other). The resulting raster representations were converted to polygons representing the providers' wireless service areas.

Data standardization
Service area datasets for each provider were clipped to the state boundary and self-intersecting lines were fixed prior to loading into the SBDD transfer schema.

DATA VERIFICATION – WIRELINE AND WIRELESS AVAILABILITY

This section describes the methods used to verify the following datasets representing wireline broadband availability (e.g., cable, xDSL, other copper wireline, fiber optic and other unclassified wireline services) by census block and/or road segment and wireless broadband availability (e.g., fixed and mobile wireless and satellite services) by service area:

- BB_Service_CensusBlock,
- BB_Service_RoadSegment and
- BB_Service_Wireless

Verification of availability data received from providers is essential to determining the accuracy and completeness of the resulting broadband availability maps and is an ongoing process. Methodologies continue to be developed and implemented for data verification and are incorporated into a confidence ranking process. The data verification and confidence ranking methods are described below.

The data verification process employs the following methods (including ground truthing, modeling, community reviews, crowd sourcing, drive testing and Web research), which supply input for the confidence ranking methodology.

1. Cable service area modeling: Cable strand data for incumbent cable providers were acquired as georeferenced MapInfo files from the MA Department of Telecommunications and Cable (DTC) in 93% of the 305 cable-served towns. The strands were imported and a 200 foot buffer was created to approximate the distance from the cable that a structure can receive service without excessive cost or delay. The 200 foot distance was selected based on observed distances between poles and the acceptable distances of structures from cable as defined in cable license agreements. Census blocks and road segments acquired from providers that intersected the resulting service area buffers for that provider were given an increased confidence score.

2. DSL service area modeling: DSL service areas were modeled from known DSL-equipped central office locations, which were geocoded using NAVTEQ streets data and refined using aerial photography, street views and bird's-eye views from Google Maps and Bing Maps. A linear network was developed, using a comprehensive roads dataset maintained by the MA Department of Transportation (MassDOT), that encompassed all roadways within 17,800 linear feet of the central office location. A 200 foot buffer of the network was created to define a maximum service distance of 18,000 feet from the central office to the service location, based on input from industry experts, with the same 200 foot distance from pole to structure that was used in the cable model. The resulting service area buffers were cropped

at town boundaries except where central offices were known to serve neighboring towns. Census blocks and road segments acquired from providers that intersected the estimated service areas for that provider were given an increased confidence score.

3. Infrastructure field surveys: Targeted field work has been performed to locate broadband infrastructure, such as DSL-equipped remote terminals (RTs). As with the central offices, locations were mapped using address and landmark information acquired in the field by geocoding with NAVTEQ streets data and refining with aerial photography, street views and bird's-eye views from Google Maps and Bing Maps. Although many DSL-equipped RTs have been located in the field, they have not yet been incorporated into the DSL service area model yet due to the difficulty of predicting the directional nature of services provided from those locations. However, the locations are valuable for visual review of DSL coverage areas claimed by providers that fall outside of modeled service areas to evaluate the likelihood of service from a given RT location. These visual reviews are performed by a team consisting of a GIS expert and a DSL technology expert. Confidence scores are modified accordingly.

4. Public surveys: Broadband subscription information is collected through web-based broadband surveys from the public and from community anchor institutions (see http://broadband.masstech.org/broadband-availability/community-involvement). The surveys are publicized through targeted events and publications and MBI email notifications. Information collected includes location, provider name, transmission technology, price, and speed for homes, businesses, and institutions throughout the state. At this time, the survey data is only used to verify availability by provider name and transmission technology. Census blocks and road segments acquired from providers that are within 200 feet of survey locations are given an increased confidence score. As with the service area models, the 200 foot distance represents the distance at which service can be provided without excessive cost or delay. In the future, speed test results will be summarized by census block to verify typical speed information received from providers as well.

   Responses to the public survey are geocoded through Google Maps and visually refined by the user if desired. Responses to the community anchor institution surveys are linked to existing point locations maintained by the Massachusetts Office of Geographic Information (MassGIS) or affiliated agency. Community anchor institutions that have changed addresses or are not already in the MassGIS datasets are geocoded using NAVTEQ streets data and refined using a combination of institution web sites and aerial photography, street views and bird's-eye views from Google Maps and Bing Maps.

   At this time, responses from the FCC's consumer broadband test are not used for data verification, but will be evaluated for inclusion in future data verification phases.

5. Provider web site information: If information acquired by providers – including availability and speed – appeared to be questionable, a search was performed on the provider's web site to confirm it. This type of verification was only performed when uncertainties arose during visual review of the data. In the future, this type of review may be incorporated into a more

structured approach to validate locations that are geographically dispersed throughout a provider's service area.

6. Community cable and DSL feedback: In collaboration with some Regional Planning Agencies (RPAs), availability maps were generated and distributed to carefully selected community representatives, such as local broadband committee members or town officials, with local knowledge of cable and/or DSL services in their town. The community representatives reviewed and marked up hard copy maps to identify services areas that extended too far or not far enough and, in some cases, provided the last known service location or address along a road. This was implemented in low confidence areas, which includes western Massachusetts and part of central Massachusetts. Confidence scores are modified based on feedback from the community representatives, and DSL service area boundaries are modified in the areas with the most knowledgeable representatives.

7. Wireless drive studies: In coordination with local colleges, teams of student volunteers were trained to perform wireless drive studies. The students drove pre-defined routes with intermittent stops to collect wireless signal location and quality information using Android phones operating QoS Solutions' QMapper and QPerf software (see www.qos-solutions.com). The drive studies were performed in the same 5 RPA regions in central and western Massachusetts as the community cable and DSL feedback projects. The drive study results will be overlaid on the wireless providers' service areas and submitted for review by the providers. Further verification or service area boundary modifications may be discussed with providers in areas with anomalous results.

Confidence Ranking

As availability data is verified, the verification status is documented in each individual census block or road segment record or subdivision of a wireless service area. The records are also assigned numeric values from 1 to 5 that represent the level of confidence in the likelihood that service is available at that location. When service availability for a given provider and technology is verified by an alternate source, the confidence value for that location is increased by one, up to a maximum score of 5. A value of 1 represents the lowest confidence in provider data and no corroborating information from alternate sources. A value of 5 represents 3 or more corroborating sources or confirmation through field work. Data of all confidence levels are included in the availability datasets; however, locations that are deemed to be inaccurate as a result of the data verification process may have their confidence value reduced and may be tagged as not part of the service area.

General guidelines of the confidence ranking process are as follows:

- Initial rankings: Data records submitted by providers are given an initial confidence ranking of "1" or "2" depending on the level of ambiguity in the submission method. For example, availability information provided by census block ID, street address or spatial object is given a confidence ranking of 2. Whereas, availability information provided as hand-drawn or narrative estimates may be given a confidence ranking of 1.

- Verification from alternate sources: If availability at a given location is corroborated by an alternate dataset (such as the cable or DSL models, broadband survey responses, cable or DSL service area feedback from community representatives, or wireless drive study data interpolation), the verified location receives a 1 point increase in the confidence score for each corroborating dataset, with a minimum score of 3 and a maximum score of 5.

- Field confirmation: If availability at a given location is confirmed by known service locations identified through field work, it is given a confidence score of 5. Confirmed field locations include known infrastructure, such as DSL-equipped remote terminals, or known service availability acquired in wireless drive studies.

Provider Feedback Loop
All providers that submitted data received a written data submission report that described the format and completeness of the datasets they provided. This report included requests for additional information or alternate formats in the next submission and other data clarifications or corrections needed. Additional feedback was provided by phone or email conversations as needed. In addition, PDF maps of estimated services, based on the census blocks and roads or wireless area boundaries, were provided for verification and/or modification. Information on conflicting alternate data sources may also be provided for comment or challenge. This process is being standardized and formalized using a web-based provider data portal.

DATA DEVELOPMENT – MIDDLE MILE INTERCONNECTION FACILITIES

This section describes the methods used to create the following dataset representing the location, technology and capacity of facilities that connect a service provider's network to another provider's network or the Internet:

- BB_ConnectionPoint_MiddleMile

Tabular data – including provider identification and facility ownership, capacity and type – were received from providers by street address or latitude and longitude. Latitude and longitude values were used to create point geometry when possible. Otherwise, street address data was geocoded using NAVTEQ streets data.

The MBI did not have alternate data sources for the verification of these datasets.

Data standardization
Facility ownership, capacity and type values were standardized to comply with valid value lists. Due to the field type of double used to store latitude and longitude, values with trailing 0's did not meet the 6-digit business rule. However, to preserve the accuracy of the data, these values were not modified to contain 6 decimal places. Latitude and longitude values received from providers with less than 6 decimal places were also not modified to prevent misrepresenting the data as more accurate than it really was.

DATA DEVELOPMENT – COMMUNITY ANCHOR INSTITUTION SERVICE SUBSCRIPTIONS

This section describes the methods used to create the following dataset representing the location and broadband service subscription of community anchor institutions throughout the state:

- BB_Service_CAInstitutions

The community anchor institution datasets deemed most relevant to broadband issues in Massachusetts were:

- K-12 schools
- Colleges and universities
- Public libraries
- Hospitals
- Community health centers
- Police stations
- Sheriffs' offices
- Fire Stations
- Career centers
- Town halls

Existing spatial datasets containing community anchor institution names and locations were acquired from state and regional agencies. The attributes were standardized and imported into a template dataset. Missing attributes (e.g., zip codes) were acquired through web searches (e.g., on institution web sites or from the US Postal Service).

Initial data requests were made to state and regional agencies and/or associations to acquire any existing compilations of information on broadband service information at affiliated anchor institutions. Complete or almost complete datasets for career centers, state police and county sheriffs were acquired from the MA Executive Office of Labor and Workforce Development (EOLWD) and MA Executive Office of Public Safety and Security (EOPSS).

For the remainder of the anchor institutions, a campaign was implemented to acquire information through phone, email and web-based surveys from individuals associated with individual anchor institutions who were knowledgeable about the institution's broadband services. Requests were also made through targeted outreach at events and in publications targeted at anchor institutions to increase awareness of broadband issues and participation in the broadband survey. Agencies and organizations that assisted in this effort included the MA Department of Secondary and Elementary Education (ESE), MA Board of Library Commissioners (MBLC), MA Chiefs of Police Association (MCOPA), Massachusetts Municipal Association (MMA), MA Department of Revenue (DOR), Mass League of Community Health Centers (MLCHC) and a CIO group for public and community colleges.

Data standardization

Survey questions were developed to request information that were easily understood and acquired by anchor institution staff. As a result, survey results required additional formatting to standardize the information in accordance with SBDD valid values. This information included broadband subscription status, transmission technology and maximum advertised speeds were collected and standardized to comply with valid value lists. In addition, street addresses for new

anchor institutions that were not in the original GIS datasets were geocoded using NAVTEQ streets data and refined using visual references such as Google satellite photography and street view imagery.

In some cases, standardized transmission technology attribute values were used by the MBI to track uncertain technology categories. These were converted in the final datasets, as shown below, to comply with SBDD valid values.

MBI Technology Values	SBDD Technology Values
1: Unknown	0: Other
42: Cable - DOCSIS Unknown	40 or 41: Cable - DOCSIS 3.0 or Other (depending on provider)
72: Fixed Wireless - Unknown	70: Fixed Wireless - Unlicensed

In some cases, transmission technology was corrected to reflect the service known to be offered by the specified provider. For anchor institutions that have more than one broadband connection, only records with the maximum speeds for each transmission technology type were included. For anchor institutions that did not provide broadband information, the broadband service field was set to unknown (BBSERVICE = U).

BROADBAND CHALLENGES IN MASSACHUSETTS

Broadband access differs significantly between the eastern, central and western parts of the state as well as the cape and islands. The majority of "unserved" and "underserved" communities are in western Massachusetts, which represents approximately 1/3 of the land mass in the state. Barriers to broadband access and deployment in this region are primarily due to topography, vegetation and population density. Western Massachusetts, as well as Cape Cod and the islands, currently lacks the middle mile infrastructure needed to encourage private sector development of last mile service or to achieve downstream speeds of 4 Mbps. By the fall of 2013, a new 1,200 plus middle mile network called ***MassBroadband 123*** will be operational in western and north central Massachusetts, built by the MBI using state and federal funds.

Wireline broadband availability in Massachusetts, particularly in western Massachusetts, is overstated in the current broadband datasets. This is due, in part, to generalizations resulting from census block size and population distribution in rural areas. DSL service is not available to new customers in some western Massachusetts towns because they are already at their maximum capacity. The MBI is working with communities to incorporate local knowledge of service availability in our feedback to broadband service providers and flagging census blocks and road segments requiring additional verification.

Wireless broadband availability in Massachusetts is also overstated. The reliability of propagation modeling has been identified as a concern in establishing wireless broadband availability. Although topography is factored into propagation models, vegetation is also a significant barrier to wireless in Massachusetts and makes it difficult to determine if service is

really available at a location. Responses to the MBI survey also indicate that typical mobile wireless speeds do not always qualify as broadband.

Information provided by the community anchor institutions also requires additional review and modification. Respondents had difficulty selecting the correct transmission technology (e.g., the provider name frequently did not correspond to the technology) and often did not know the advertised speed of their service.

BROADBAND PROVIDERS IN MASSACHUSETTS

The MBI performed web research and/or attempted to contact all of these companies to verify if they were a broadband service provider in Massachusetts. Potential providers were asked the following questions to determine how to classify them on the list and if they should be included on the state and national broadband maps.

1. Do you provide broadband services in MA?
2. What part(s) of MA do you serve?
3. What type of broadband services do you offer?
   - What type of technologies?
   - Do you offer residential services, business services or both?
4. Do you own the infrastructure or are you a reseller?
5. Do you offer separate services under different names or do you have multiple names related to the same service?
6. Can you provide service within 10 days?

Below is the full list of providers potentially offering broadband services in Massachusetts, including companies that filed FCC Form 477 and additional providers identified by the MBI through other sources. Alternate provider names, resulting in duplicate provider entries, were removed from the list.

The list is broken down into three sections.

1. Verified providers with data included in the data submission.
2. Verified providers in Massachusetts that were not included in the data submission. (Note: This category is made up primarily of resellers and other providers that do not fit the SBDD definition of a broadband service provider, generally because they can't provide service within 10 days.)
3. Other companies that do not offer broadband service in Massachusetts.

A. Verified providers included in the April 2013 data submission

Number	Filing Company DBA	Provider Type
1	AT&T Corp, Inc.	Meets NOFA Definition
2	AT&T Mobility LLC	Meets NOFA Definition
3	BELD Broadband	Meets NOFA Definition
4	Charter Communications Inc.	Meets NOFA Definition
5	Chappy WISP	Meets NOFA Definition
6	Clearwire Corporation	Meets SBDD Definition
7	Comcast	Meets NOFA Definition
8	Country Roads Networks, Inc.	Meets NOFA Definition
9	Covad Communications Company	Meets NOFA Definition
10	Cox Communications	Meets NOFA Definition
11	FairPoint Communications	Meets NOFA Definition
12	Fibertech	Other
13	GAW High-Speed Internet Inc	Meets NOFA Definition
14	HGE.net Fiber Optic Internet	Other
15	HughesNet	Meets NOFA Definition
16	Level 3 Communications, LLC	Other
17	MetroPCS	Meets NOFA Definition
18	Norwood Light Broadband	Meets NOFA Definition
19	OTT Communications	Meets NOFA Definition
20	PMLDnet.com	Meets NOFA Definition
21	RCN	Meets NOFA Definition
22	Richmond Telephone Company	Meets NOFA Definition
23	Russell Municipal Cable T.V.	Meets NOFA Definition
24	Shrewsbury Electric and Cable Operations (SELCO)	Meets NOFA Definition
25	Sidera Networks	Meets NOFA Definition
26	Sprint	Meets NOFA Definition
27	StarBand Communications Inc.	Meets NOFA Definition
28	Time Warner Cable	Meets NOFA Definition
29	T-Mobile	Meets NOFA Definition
30	USAi.net	Meets NOFA Definition
31	Verizon	Meets NOFA Definition
32	Verizon Wireless	Meets NOFA Definition
33	Warwick Broadband Service	Meets NOFA Definition
34	WildBlue Communications, Inc.	Meets NOFA Definition
35	WiSpring	Meets NOFA Definition

B. Verified providers not included in the April 2013 data submission

Number	Filing Company DBA	Provider Type
36	DSCI Corporation	Meets SBDD Definition
37	Mega Broadband Inc.	Meets SBDD Definition
38	segTel, Inc.	Meets SBDD Definition
39	Sentinel Tree Telephone Company	Meets SBDD Definition
40	Towerstream	Meets SBDD Definition
41	tw telecom inc.	Meets SBDD Definition
42	Wave2Wave Communications Inc.	Meets SBDD Definition
43	XO Communications Inc.	Meets SBDD Definition
44	Ace Innovative Networks, Inc.	Reseller
45	ACN, Inc.	Reseller
46	ACN, Inc.	Reseller
47	Airespring, Inc.	Reseller
48	American Telephone Company LLC	Reseller
49	Bandwidth.com, Inc.	Reseller
50	Barry Communications, Inc.	Reseller
51	BCN Telecom, Inc.	Reseller
52	Broadcore, Inc.	Reseller
53	Broadview Networks Holdings, Inc.	Reseller
54	BullsEye Telecom, Inc.	Reseller
55	Communication Solutions Partners, Inc.	Reseller
56	Cordia Corporation	Reseller
57	Evolve IP, LLC	Reseller
58	Fidelity Voice Services LLC	Reseller
59	Granite Telecommunications, LLC	Reseller
60	iCore Networks, Inc.	Reseller
61	Internet & Telephone, LLC	Reseller
62	LY Holdings, LLC	Reseller
63	McGraw Communications, Inc.	Reseller
64	Metropolitan Telecommunications Holding Company	Reseller
65	Midwest Marketing Group, Inc.	Reseller
66	Network Billing Systems LLC	Reseller
67	New Edge Holding Company	Reseller
68	nexVortex, Inc.	Reseller
69	One Communications	Reseller
70	Qwest Communications International, Inc.	Reseller
71	Smart Choice Communications, LLC	Reseller
72	Stage 2 Networks, LLC	Reseller

Number	Filing Company DBA	Provider Type
73	TReseller Technologies	Reseller
74	Utel, Inc.	Reseller
75	Velocity Networks Inc.	Reseller
76	Broadvox Go!, LLC	Other
77	Cbeyond Communications, Inc.	Other
78	Cogent Communications Group	Other
79	Cypress Communications, Inc.	Other
80	EarthLink	Other
81	Ernest Communications, Inc.	Other
82	FiberTower Network Services Corp.	Other
83	Global Crossing	Other
84	Lightower Fiber Networks	Other
85	M5 Networks, Inc.	Other
86	PaeTec Corporation	Other
87	South Hadley Electric Light Department	Other
88	Telesphere Networks Ltd.	Other
89	Transbeam Inc.	Other
90	Vocal IP Networx Ltd.	Other
91	Westfield Gas and Electric	Other

C. Other companies that do not offer broadband service in Massachusetts

Number	Filing Company DBA	Provider Type
92	5LINX Enterprises, Inc.	No service in MA
93	8x8, Inc.	No service in MA
94	Access One, Inc.	No service in MA
95	Access Point, Inc.	No service in MA
96	Accessline Holdings, Inc.	No service in MA
97	Apptix, Inc.	No service in MA
98	Aptela, Inc.	No service in MA
99	Birch Communications Inc.	No service in MA
100	C3IP Communications LLC	Dissolved/Liquidated
101	Call Catchers, Inc.	No service in MA
102	Cause Based Commerce Inc.	No service in MA
103	Cincinnati Bell Inc.	No service in MA
104	CommPartners Holding Corporation	No service in MA
105	ConnectMe, L.L.C.	No service in MA
106	Cordia Corporation	No service in MA
107	DataNet Communications Group, Inc.	Needs further research

Number	Filing Company DBA	Provider Type
108	Equinox, Inc.	No service in MA
109	First Communications, LLC	No service in MA
110	GlobalPhone Corp.	No service in MA
111	GreatCall, Inc.	No service in MA
112	IDT Corporation	No service in MA
113	InPhonex.com, LLC	No service in MA
114	IP Communications, LLC	No service in MA
115	Jivetel Communications	No service in MA
116	Kosmaz Technologies, LLC	No service in MA
117	LightSquared LP	No service in MA
118	Matrix Telecom, inc.	No service in MA
119	Millicorp	No service in MA
120	Mitel Netsolutions Inc.	No service in MA
121	Mix Networks, Inc.	No service in MA
122	N.W.ComTech, Inc	No service in MA
123	Navigator Telecommunications, LLC	No service in MA
124	NextWave Wireless Inc.	No service in MA
125	NOS Communications, Inc.	No service in MA
126	OnWav, Inc.	No service in MA
127	Openairboston.net	No service in MA
128	Phone.com, LLC	No service in MA
129	PNG Telecommunications, Inc.	No service in MA
130	Proximiti Technologies, Inc.	No service in MA
131	Quality Telephone Inc.	No service in MA
132	Razorline LLC	No service in MA
133	Reign Integrated Network Solutions LLC	No service in MA
134	Semperon Corporation	No service in MA
135	Spectrotel, Inc.	No service in MA
136	Telekenex, Inc.	No service in MA
137	TelLan Network Technologies, Inc.	No service in MA
138	Thinking Phone Networks, LLC	No service in MA
139	Tidal Communications, LLC	No service in MA
140	Trans National Communications International, Inc., TNCII	No service in MA
141	vCom Solutions	No service in MA
142	VoIPStreet, Inc.	No service in MA
143	Vonage Holdings Corp.	No service in MA
144	Zayo Group, LLC	No service in MA

Maryland Broadband Mapping Initiative
Broadband Availability Map Data
Submission Summary for Spring 2013

March 28, 2013

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Table of Contents

Submission Summary

The staff of the Eastern Shore Regional GIS Cooperative (ESRGC) at Salisbury University in Salisbury, Maryland, in its role as primary technical lead for the Maryland Broadband Mapping Initiative, originally contacted 120 potential facilities-based broadband service providers (BSPs), receiving data from 41 providers representing 39 different companies (See Appendix A). In this seventh submission, 47 different companies responded to our data request. An overall summary of the Spring 2013 data submission can be described as:

49 potential facilities-based broadband service providers were contacted
4 BSPs from previous submissions were not contacted because they have merged with other BSPs
2 BSPs did not respond but had in previous submissions
2 BSPs responded but did not provide updated data
45 BSPs responded and either provided data or affirmed no change to data

Of those that provided broadband availability data,

17 provided addresses
3 provided census block information only
8 provided census blocks and road segments
20 provided wireless coverage areas

In addition, 9 of the 47 responsive BSPs provided middle mile infrastructure points

Since our last submission, we gained one participant namely ALTIUS Communications, LLC. PAETEC Communications and Cavalier Telephone Mid-Atlantic were both purchased by Windstream. However, this transaction is so recent that Windstream is not capable of participating in this data collection round. Therefore, we will be submitting PAETEC and Cavalier separately with the expectation that those service areas will be represented by Windstream in the Fall submission.

Data Processing

For a specific discussion of the data processing steps for any particular BSP, please see the individual dataset report for each BSP below. In general, the data processing used to create the Spring 2013 data submission depended on the type of data provided by the BSP.

Census Blocks

To process the served census blocks, the steps are as follows. First, geocode the provider-submitted address table (if applicable) to the ArcGIS 10 US Streets Geocode Service. Second,

spatially join the address points to the Year 2010 census blocks. Third, divide the address points into the different technologies of transmission. Fourth, select those address points that are within the census blocks that are greater than 2 mi^2, exporting them as a separate feature class. Fifth, switch the selected set (thus creating all the address points in blocks that are less than 2 mi^2), and select those blocks. Sixth, import the provider-submitted table of served census blocks and merge with the address-created blocks (if applicable). Finally, export the results.

Road Segments

To process the served road segments that are within census blocks that are greater than 2 mi^2, we import the table of road segment address ranges provided by the BSP, unless a Tiger Line ID (TLID) is provided. We then take the TO address values and the FROM address values on both the left and the right side of the segment and concatenate those address numbers with the street name, type, and direction, thus creating a maximum of 4 point addresses per road segment. Those point addresses are then address matched against the ArcGIS 10 US Streets geocoding service. We can then find the street segments in TIGER that are adjacent to the located points. Finally, we select those TIGER lines that intersect the census blocks that are greater than 2 mi^2. If a TLID is provided we join the delivered table to the appropriate year Tiger Lines by the TLID and the joined results are exported. The result can be loaded into the SBDD Transfer data model.

Service Addresses

The process for creating the service addresses is the same as the census blocks (above), except that the addresses that fall within the census blocks that are greater than 2 mi^2 are kept as the key feature class.

Middle Mile Infrastructure

Processing the middle mile infrastructure is relatively trivial, in that the providers submit geographic coordinates with the middle mile attributes. Most of the providers, however, do not submit new middle mile data every six months. Therefore, any middle mile infrastructure collected during previous submission periods have been include in the current submission.

Community Anchor Institutions

For the Spring 2013 data submission, the Center for GIS at Towson University (CGIS) improved the quality of Maryland's Community Anchor Institution (CAI) broadband dataset by focusing on the following action items.

- Strengthened the relationship with the Maryland Department of Health and Mental Hygiene (DHMH). Adapted the medical physician office database obtained from DHMH to conform to Maryland's CAI database.

- Worked with the Assistant State Superintendent for Libraries to develop and disseminate a survey for all Maryland Public Libraries.

- Updated Baltimore City's CAI locations.

- Populated contact information for targeted CAI facilities in preparation for an online verification tool to allow for self-reporting (in development).

The two categories with the most significant changes are medical and libraries. Through our contact with DHMH we were able to add physicians back to the medical category. As described in the medical/healthcare section of this narrative, some cleanup was required of the data to conform to the requirements of the database; however DHMH is considered the authoritative source of the data as well as the source for collecting future broadband information. The broadband data for all public libraries has been gathered and updated for this submission due to the support garnered from the Assistant State Superintendent for Libraries.

Libraries

For the Spring 2013 submission, the data collection team continued to focus its outreach efforts on working with Ms. Irene M. Padilla, Assistant State Superintendent for Libraries. Ms. Padilla followed through on her commitment to provide contact information of county-level IT support personnel who would be able to provide the desired information for Maryland's 202 public libraries. The team prepared individual spreadsheets and sent them to each county-level IT contact containing the known broadband data for all libraries under the responsibility of each contact. All IT contacts responded to the surveys, with minimal follow-up required. The process established for public library data collection is repeatable, and it is anticipated that future data updates can be completed with minimal effort. Thus, the library portion of the CAI dataset submission contains 369 records. Of these, 202 are public libraries for which broadband information was updated for this submission.

Medical

The data collection team worked with Dr. David Sharp, Director of the Center for Health Information Technology (a component of the Maryland Healthcare Commission within the Department of Health and Human Services [DHMH]), to build a sustainable approach to collect and maintain the medical Community Anchors and associated broadband data. Dr. Sharp's team conducts a mandatory annual census on all licensed ambulatory surgery facilities, long-term care, hospitals, and physicians in Maryland. Although the census does not currently collect broadband information, Dr. Sharp agreed to add the Maryland Broadband Mapping team's CAI data questions to the April 2013 census for ambulatory surgery facilities and the July 2013 long-term care, hospital, and physician census. This will assist with sustainability for collecting and maintaining broadband information for medical facilities and physicians.

Maryland has over 20,000 physicians with active licenses in the State. Not all of these physicians are actively seeing patients. For example, Maryland has a high number of academic medical facilities with academic physicians. To accommodate for these scenarios, Maryland decided to only include locations of medical offices. Each medical office may have one physician or many physicians. The CAI dataset only includes one spatial location for each office regardless of the number of physicians. We made the assumption that broadband is purchased at the office level. The team worked with Dr. Sharp to obtain authoritative, up-to-date physician data. An Excel file was provided and was aggregated by practice name and the number of physicians at each practice. After reviewing the data anomalies were noticed. Through further discussions with Dr. Sharp, it was evident that additional data cleansing was required. Our internal database now includes suite numbers so that we can determine when several medical practices may utilize the same physical address, but are likely responsible for their own broadband service.

Data for all other medical facilities are from The Office of Health Care Quality (OHCQ). OHCQ updates the licensed medical facility data on a monthly basis and makes the data available on the OHCQ website (http://dhmh.maryland.gov/ohcq/SitePages/Licensee%20Directory.aspx).

Baltimore City

The Baltimore City CAI data was updated with data retrieved from Baltimore City's Open Data Catalog website (https://data.baltimorecity.gov). Baltimore City is providing access to authoritative datasets and therefore these datasets are considered the authoritative source for Maryland's CAI database. The only time when records in the CAI database were NOT replaced was when other authoritative sources for the data were determined. For example, OHCQ was the source of the original record for medical practices.

Shentel

A broadband provider in Maryland, Shentel (https://www.shentel.com/), submitted broadband data for four public schools along with their provider area submissions. This information was updated in the database.

Online Verification Tool Preparation

A CAI Verification tool is being developed for deployment on the Maryland Broadband Mapping Initiative (MBBMI) website. This will allow CAIs to access and verify their existing information, and self-report missing or updated information. The tool will provide a convenient method for CAIs where reporting individually is the preferred option, versus through an overseeing agency (Maryland State Department of Education, for example). This tool is expected to greatly streamline our efforts to reach out to CAIs such as private schools, volunteer fire departments, and non-governmental community support organizations. In preparation for this tool, individual contacts were compiled for private schools and other libraries along with a message to promote a positive return of responses and new data.

In summary, the Maryland broadband CAI database now contains 15,638 records, an increase of 5,063 (47.9%) from the Fall 2011 submission. The vast majority of this increase came from the inclusion of the physician database at DHMH, which we believe to be of excellent quality. There was also a modest increase (106 or 2.9%) in the number of CAI locations with broadband service information.

		Fall 2012 Submission			Spring 2013 Submission		
	CAI Category	# CAIs with BBSERVICE	Total CAIs	% of CAIs with BBSERVICE	# CAIs with BBSERVICE	Total CAIs	% of CAIs with BBSERVICE
1	School (K-12)	1,433	1,916	74.8%	1,433	1,931	74.2%
2	Library	273	369	74.0%	277	369	75.1%
3	Medical / Healthcare	95	2,705	3.5%	95	7,824	1.2%
4	Public Safety	1,031	1,714	60.2%	1,039	1,718	60.5%
5	University / College/Other Post-Secondary	96	108	88.9%	97	114	85.1%
6	Other Community Support - Government	712	1,398	50.9%	714	1,505	47.4%
7	Other Community Support - Non-Government	68	2,365	2.9%	66	2,177	3.0%
	Total	**3,615**	**10,575**	**35.1**	**3,721**	**15,638**	**35.1%**

Data Verification

The ESRGC, in partnership with the Center for GIS at Towson University and as a subcontract to the SBDD grantee in Maryland, the Maryland Broadband Cooperative, conducted a number of verification and validation tests on the provider-submitted broadband availability data. In the event that inconsistencies or errors were found, certain changes are made to the provider-submitted data. These changes are either retention but modification to provider-submitted data or the removal of the provider-submitted data, depending on the type and severity of the error. Given our extensive review and testing of broadband availability information in Maryland, we feel confident that the changes we make are improving the accuracy of the provider's submission. We continue to search for new ways to refine the submitted data and present an ever-increasing accurate portrayal of broadband availability in our state.

In the first phase of data validation, the provider-submitted data is processed for inclusion within the NTIA transfer model. During this processing, several data inconsistencies can be found. They include:

1) Submitted download and upload speeds do not match the values expected for a given technology of transmission

2) Service addresses are located hundreds of miles away from the provider's known service areas
3) Served blocks with technologies and speeds that do not meet the working definition of broadband
4) Addresses/road segments/blocks that have no technology of transmission

For each of these, the initial remedy is to contact the provider for clarification/modification. If that communication is not successful for whatever reason, the data team makes a decision to either modify the data to match expected values or removes the errant data.

In the second phase of data validation, a maximum of fourteen data checks are conducted on each of the provider-submitted broadband availability data, listed below. Different versions of data verification tests were conducted on submissions from wireline broadband providers versus wireless providers, because of the differing submission geometry. Each check will be explained in detail below. The result of each of these tests is an error statistic, cataloged in a data verification report. No changes to the data are made based on these tests.

1) Maximum down/upload speeds reported by provider
2) Typical down/upload speeds reported by provider
3) Typical down/upload speed from speed tests
4) Speed tests match reported typical speeds or are within 1 speed tier
5) Speed tests present within blocks not reported as served by provider
6) Census blocks/coverage area reported to project, but no tract reported directly to FCC
7) Tracts reported directly to FCC, but no census blocks/coverage area reported to project
8) Census blocks/coverage areas versus unserved area locations reported
9) Total number of unserved area locations reported per provider
10) Web search verification
11) Wireless broadband presence and speed systematic field sampling
12) Comparison of areas reported as served in last submission, to areas served this submission

For this Spring 2013 submission, we have eliminated the following verification tests:

Census blocks that are outside provider's cable franchise boundary
Census blocks that are within another provider's cable franchise boundary
Census blocks that are outside DSL boundary

The MBBMI team no longer has confidence in these boundaries being accurate. The boundaries we were using were created pre-2009 and we have not been able to find another reliable source for this information.

Finally, the third and final phase of data validation is an in-depth discussion of a provider's data submission and the subsequent data tests with the provider via web conference. During this discussion, a detailed review of the submission takes place including an examination of their resulting availability maps. For Spring 2013, we returned 16 service area maps to the providers and 9 providers verified the maps represented their data submission correctly. Efforts to engage the providers in a more in-depth discussion of potential map errors were largely futile.

Maximum down/upload speeds reported by provider

Facilities-based BSPs are required to provide the maximum downstream and upstream speeds by the NTIA and the NoFA of August 2009. These speeds are dependent upon the technology of transmission the BSP uses to deliver broadband service. Speeds are reported in ordinal categories, or tiers, as defined by the NoFA. They are:

Downstream Speed Tier	Upstream Speed Tier	Corresponding Speed
--	1	Less than or equal to 200 kbps
--	2	Greater than 200 kbps and less than 768 kbps
3	3	Greater than or equal to 768 kbps and less than 1.5 mbps
4	4	Greater than or equal to 1.5 mbps and less than 3 mbps
5	5	Greater than or equal to 3 mbps and less than 6 mbps
6	6	Greater than or equal to 6 mbps and less than 10 mbps
7	7	Greater than or equal to 10 mbps and less than 25 mbps
8	8	Greater than or equal to 25 mbps and less than 50 mbps
9	9	Greater than or equal to 50 mbps and less than 100 mbps
10	10	Greater than or equal to 100 mbps and less than 1 gbps
11	11	Greater than or equal to 1 gbps

For this data check, the maximum downstream/upstream speeds reported from each provider are summarized in a table. These speeds are summarized for census blocks, wireless coverage areas, road segments, and service address points.

For the data submission, 51 providers (100%) reported maximum downstream/upstream speeds for census blocks. The lowest maximum downstream speed reported is greater than or equal to 768 kbps and less than 1.5 mbps, reported by 11 providers. The highest maximum downstream speed was greater than or equal to 1 gbps, reported by 6 providers. The most frequent maximum downstream speed was greater than or equal to 3 mbps and less than 6 mbps, reported by 16 providers.

Typical down/upload speeds reported by provider

BSPs are required to provide the typical downstream and upstream speeds by the NTIA and the NoFA of August 2009. Typical speeds are, per the NoFA, intended to be "the data transfer

throughput rate that most subscribers to service at the maximum advertised downstream speed can achieve consistently during expected periods of heavy network usage." These speeds are dependent upon the technology of transmission the BSP uses to deliver broadband service. Speeds are reported in ordinal categories, or tiers, as defined by the NoFA (see table above).

For this data check, the typical downstream/upstream speeds reported from each provider are summarized in a table. These speeds are summarized for census blocks, wireless coverage areas, road segments, and service address points

For the data submission, 27 providers (53%) reported typical downstream/upstream speeds. The lowest typical downstream speed was greater than or equal to 768 kbps and less than 1.5 mbps, reported by 9 providers. The highest typical downstream speed was greater than or equal to 1 gbps, reported by 2 providers. The most frequent typical downstream speed of the census blocks was greater than or equal to 3 mbps and less than 6 mbps, reported by 9 providers.

Typical down/upload speed from mobile speed test
Typical down/upload speed from computer-based speed test

Beginning in April 2010, the MBBMI team and the FCC (nearly simultaneously) began collecting speed test information from broadband consumers in the state of Maryland. This speed test information included the downstream and upstream speed in kbps, the signal latency, the street address of the tester, the type of connection location (home, work, etc), the connection technology (cable/DSL, fiber optic, satellite/dial-up, or unknown – MBBMI test only), the IP address of the test machine, and the corresponding BSP. The MBBMI contracted with a company named Ookla to create their test; the FCC used both Ookla and an alternative method developed by a company named MLab. About the same time, the FCC also launched its mobile speedtest application for both iOS and Android operating systems. This app tests both WiFi connection speeds as well as cellular service speeds, reporting the type of connection, the latitude/longitude, and the IP address. For both types of tests in order to determine the BSP, we purchase a database from MaxMind, Inc. that links IP address ranges to BSP names.

From mid-April 2010 until January 31, 2013, 12,141 speed tests were collected by MBBMI and 31,492 PC-based speed tests were collected by the FCC (the FCC also collected mobile speed tests, see below). After removing any MLab-based FCC speed tests to insure consistent speed test results and removing any without a valid address, the FCC and the MBBMI speed tests were then combined and geocoded using their street address. With about 12% of the addresses not being able to be resolved, a total of 22,334 of PC-based speed tests were used in verification processing. For the same period, a total of 105,180 mobile-based speed tests were used.

The speed tests associated with each reporting BSP were extracted from the geocoded set. The downstream and upstream speeds were classified according to the NTIA's speed tiers (see table above) and the number of tests in each tier were counted. A table of those results in included in each data validation/verification report. For mobile broadband providers, a distinction was made between the results from mobile speed tests (generated by an iOS or Android app) and the results from computer-based speed tests (generated by a web-based speed test) as those results are likely to be different (due to significant hardware/software differences) even though the network being accessed is the same

For the state of Maryland as a whole, the PC-based speed test results are:

Speed Tier	Number of Downstream Tests	% of Downstream Tests	Number of Upstream Tests	% of Upstream Tests
1	554	2.5%	1,605	7.2%
2	1,684	7.5%	5,141	23.80
3	2,093	9.4%	1,437	6.4%
4	2,083	9.3%	3,084	13.8%
5	1,997	8.9%	6,668	29.9%
6	2,749	12.3%	1,723	7.7%
7	8,385	37.5%	2,343	10.5%
8	2,123	9.5%	298	1.3%
9	578	2.6%	29	0.1%
10	88	0.4%	6	0.0%

For the state of Maryland as a whole, the mobile speed test results are:

Speed Tier	Number of Downstream Tests	% of Downstream Tests	Number of Upstream Tests	% of Upstream Tests
1	8,688	8.3%	16,082	15.3%
2	14,881	14.1%	25,206	24.0%
3	14,728	14.0%	16,754	15.9%
4	16,811	16.0%	11,456	10.9%
5	13,925	13.2%	17,937	17.1%
6	10,366	9.9%	7,081	6.7%
7	22,942	21.8%	9,525	9.1%
8	2,806	2.7%	1,118	1.1%
9	30	0.0%	19	0.0%
10	3	0.0%	2	0.0%

Speed tests match reported typical speeds or are within 1 speed tier

For the 36 providers that submitted typical speeds for their data, a comparison was conducted between the mode (the most frequent value) of the typical download speed tier from the provider area and the FCC/Ookla speed tests. In instances where the most frequent download speed tier from the speed tests matched, or was within one tier of, the typical download speed tier from the provider, the response to this statement is affirmative (9 providers). When the response to this statement is negative (11 providers), there is question about the typical download speeds that have been submitted by the provider. The remaining 7 providers provided typical speeds but none of their customers have taken a speed test to verify.

Speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted)
Number and percentage of mobile speed tests verifying coverage area
Number and percentage of computer-based speed tests verifying coverage area

Using the location of speed tests submitted through the FCC or the MBBMI speed test tools, the team sought to compare the location of broadband availability submitted by BSPs and the location of actual broadband service reported by speed test takers.

For this verification test on wireline provider census block submissions, the number of census blocks served (as determined by the location of a speed test) but were not reported by provider were calculated. That number is then divided by the total number of blocks submitted by the provider, reported as an error percentage.

For the state of Maryland, the maximum number of census blocks shown to be served by speed test data but not reported by a BSP is 62 (for Comcast Cable Communications, LLC , 0.17% of their total reported blocks). The minimum percentage of served census blocks confirmed by speed test was 0% (6 providers). The maximum percentage was 177.7% - Cogent had 16 blocks with speed tests but only reported 9 total blocks.

For this verification test on wireless provider coverage area submissions, the following statistics are reported:

1) Confirmation of coverage area served
    - The number/percentage of computer-based speed tests that fall within the BSP's reported coverage area(s).
    - The number/percentage of mobile speed tests that fall within the BSP's reported coverage area(s).
2) Area served, not reported by provider
    - The number/percentage of computer-based speed tests that fall outside the BSP's reported coverage area(s).

- The number/percentage of mobile speed tests that fall outside the BSP's reported coverage area(s).

For the wireless providers in the state of Maryland, 60% (9 of 20) had computer-based speed tests submitted by users. The maximum number of computer-based speed tests shown to fall within the reported coverage area of a BSP is 651 (for Sprint, 97.2% of their computer-based speed tests). Some BSPs that has 100% of their computer-based speed tests fall within their reported coverage area namely ATTWireless, Cricket Communications, Hughes Communications, Easton Utilities, and ViaSat Communications, Inc. The minimum percentage of computer-based speed tests shown to fall within the reported coverage area of a BSP was 93.2% (Clearwire, 123 tests fell inside out of 132). On average, 98.6% of computer-based speed tests fell within the BSP's reported coverage area.

Regarding the number of mobile speed tests that fall within the reported coverage area of a BSP, 60% (12 of 20) of the wireless BSPs had tests and the maximum number came from Sprint customers, with 14,033 tests within their reported coverage area. Five wireless BSPs had 100% of their mobile speed tests fall within their reported coverage area: Brookwood, Cricket Communications, Hughes Communications, Shentel, and ViaSat Communications, Inc. Clearwire had the smallest percentage of tests falling within their reported coverage area – 82.5%. On average, 97% of mobile speed tests fell within the BSPs reported coverage areas.

Census blocks/coverage area reported to project, but no census tract reported to FCC
Census tracts reported to FCC, but no census blocks/coverage areas reported to project

Another source of data validation was the FCC's Form 477 data as of December 2011, the most recent dataset made available to SBI grantees. This dataset is collected semi-annually by the FCC from BSPs, both facility-based and not facility-based. The BSPs report the number of residential and business subscribers to their broadband service per census tract. For comparison, the average census tract in Maryland contains 103 census blocks. While the Form 477 data is much coarser than the SBDD-reported data, it still aligns spatially.

Therefore, as another verification check, we test the number of census blocks that are reported by wireline BSPs that have no corresponding reported census tract in the BSP's Form 477 data. Similarly, we test the number of tracts from the wireline BSP's Form 477 data that do not have corresponded census blocks reported in this initiative.

For the state of Maryland, the maximum number of census blocks that were reported as served but had no corresponding Form 477 census tract was 14,072 from Megapath Corp. On average, 1,073 census blocks (from 21 providers) had no corresponding census tract. The maximum number of census tracts that had no corresponded reported census blocks was 127 from XO Communications, Inc. On average, 16 census tracts (from 22 providers) had no corresponding census blocks.

For wireless BSPs, we tested the number of census tracts that either intersect or do not intersect each reported coverage area. Because it is not possible to tell what portion of the Form 477 reported census tract may receive the wireless service, a simple intersect between served tracts and coverage areas is the only test available from these data sources. For those wireless BSPs reporting to the FCC on Form 477 (9 of 20), all but two had 100% of their served census tracts intersecting their reported coverage areas. Both Clearwire and NTELOS had less, with 99% of their 477 census tracts intersecting their coverage area.

Census blocks/coverage areas versus unserved area locations reported
Total number of unserved area locations reported per provider

At the MBBMI website (www.mdbroadbandmap.org) and at the FCC website (www.broadband.gov), residents and business owners have the opportunity to report unserved areas. These are locations, specifically addresses, at which the potential broadband customer cannot access broadband service. Those unserved area reports are taken in by the MBBMI team, geocoded according to their address, and are examined for their spatial coincidence with BSP availability coverages. For each wireline provider, the number of census blocks reported as served that contain a unserved area report are calculated, as well as the total number of unserved area reports within a BSPs availability area. For each wireless BSP, the number/percentage of unserved area reports from both the FCC and the MBBMI that fall within and outside the reported coverage area are calculated. In order to be sure that our test is measuring current conditions, we are only including unserved area locations from August 2012 – February 2013.

It is important to note that, at the present time, these unserved area reports are unverified. It is possible that broadband service may be available either at the address (but the person reporting the unserved area location was unaware of service availability), or not available at the address because of some unique configuration problem at that address specifically. It is also entirely possible that portions of a census block may be served but other portions may not.

For the state of Maryland, the maximum number of a wireline BSP's available census blocks that contain an FCC unserved area location report is 129 (Verizon Communications, Inc.). This represents 0.17% of Verizon's reported census blocks. The maximum rate of deadzone reports as a percentage of blocks reported is 4.6% (Alantech Online, Inc.). The minimum number is 0 (15 providers). The maximum number of unserved area location reports in a wireline BSP's available area is 201 (Verizon Communications, Inc.). For those unserved area locations reported by the MBBMI, the maximum number of census blocks that contain a report is 45 (Megapath Corp.). This represents 0.07% of Megapath's reported census blocks. The maximum rate of deadzone reports as a percentage of blocks reported is 0.27% (Easton Utilities). The minimum number is 0 (21 providers). The maximum number of unserved area location reports in a wireline BSP's available area is 47 (Verizon Communications, Inc.).

For the state of Maryland, the maximum percentage of unserved area locations reported from the FCC within a wireless BSP's reported coverage area is 100% (each are satellite providers). The maximum percentage of unserved area locations reported from the FCC within a non-satellite wireless BSP's reported coverage area is AT&T Wireless at 100% (303 of 303). The average percentage of unserved area locations (reported from the FCC) that fall within a wireless BSP's reported coverage area is 40% (121 of 303). For those unserved area locations reported by the MBBMI, the maximum percentage of unserved area locations within a wireless BSP's reported coverage area is 100% (101 of 101), true for each of the satellite wireless providers (HughesNet, StarBand, and ViaSat). The maximum percentage of unserved area locations reported from the MBBMI within a non-satellite wireless BSP's reported coverage area is AT&T Wireless at 100%. The average percentage of unserved area locations (reported from the MBBMI) that fall within a wireless BSP's reported coverage area is 36.9% (37 of 101).

Web search verification

Some broadband service providers publish service availability query tools on their corporate websites. The MBBMI team took the opportunity to test the broadband availability areas submitted by the BSPs against the BSP's web-based service availability tools. A systematic sampling grid was created for the entire state of Maryland. A sample point was placed every 4000 meters, then the nearest property address (within at most 1000 m) was chosen. This yielded a grid of 1,472 sample points. In Baltimore City, an additional 24 sample points were added (approximately every 2000 meters) in order to have reasonable sampling density within the small area of the City. This brought the total sample points to 1,496.

For each BSP that had a web-based service availability query tool (11 providers), the sample point grid addresses were used to verify the availability of service (or lack thereof) compared to both the reported service area, the area just outside the stated service area, and a random selection of grid points across the state. The following combinations of reported service vs. queried service were tallied:

1) A census block/coverage area was reported as served and the sample was returned as served
2) A census block/coverage area was reported as served but the sample was returned as unserved
3) A census block was not reported as served (or the location was outside the wireless coverage area) and the sample was returned as not served
4) A census block was not reported as served (or the location was outside the wireless coverage area) but the sample was returned as served

The total number of sample points in categories 2 and 4 are reported as error (of commission and of omission, respectively).

For Comcast and Verizon, all 1,496 sample points were used as those two BSPs offer broadband service in all areas of the state.

For the eleven wireline BSPs in the state of Maryland that have an Internet-based availability tool, the maximum omission error rate was 24.6% reported by Comcast. The minimum omission error rate was 0% and was reported by Charter Communications and Starpower. The average omission error rate was 11.8%. The maximum commission error rate was 47.9% reported by Antietam Cable Television. The minimum commission error rate was 0% and was reported by Armstrong Cable, Anne Arundel Broadband, and Comcast. The average commission error rate was 9.7%. The maximum total error rate was 50% reported by Antietam. The minimum total error rate was 5.5% reported by Charter. The average total error rate was 21.6%.

Wireless broadband presence and speed systematic field sampling

Wireless coverage area field testing was not conducted for the Spring 2013 submission.

Comparison of areas reported as served in last submission, to areas served this submission

It recently became clear as we were examining the broadband availability data that some of the blocks that were submitted as "served" by a provider in previous submissions were being submitted as "unserved" in later submissions. While it is certainly possible that a provider decides to stop serving the residents and businesses of a particular block, it is not probable and is more likely explained by an error either in reporting or geocoding. Therefore, we added a test that simply compares the unique block count from the previous submission to this submission. In addition to this simple test, we are making maps of change for each provider and will be reviewing those maps with the providers.

The range of change from the Fall 2012 submission to Spring 2013 was a loss of 4,893 blocks (Starpower) to no change (20 providers) to a gain of 10,826 blocks (Comcast). For those registering change (8 providers), the average was a gain of 3,718 blocks.

Individual Provider Data Summaries

Allied Telecom Group, LLC

DBA: Allied Telecom Group, LLC

Data Characteristics

Date of Original Submission:	3/7/2011
Date of Update Submission:	1/23/2013
Currency of Data:	12/31/2012
FRN:	0014531073
Type of data submitted:	Address Table
Census Block Count:	110
Total Matched Address Points Count:	215
Unmatched Address Points:	0
Number of Technology of Transmission Types:	4
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

***See ReadMe.txt**

Data Processing

Address Table Process:

- Geocode address table to Maryland Property View address locator
  - Number matched: 211
  - Number unmatched: 4
- Geocode unmatched addresses to ESRI US Streets address locator
  - Number matched: 4
  - Number unmatched: 0
- Spatially join matched address points to 2010 census blocks
- Separate addresses by technology of transmission

Census Block Process:

- Join the spatial join result to the 2010 census blocks based on the GEOID10 field for each technology
  - Export results for each technology
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
4	5	4%
7	29	21%
10	69	49%
11	38	27%

Max Upload Category	Count	% of Blocks
4	5	4%
5	29	21%
10	69	49%
11	38	27%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
4	5	4%
7	29	21%
10	69	49%
11	38	27%

Typical Upload Category	Count	% of Blocks
4	5	4%
5	29	21%
10	69	49%
11	38	27%

Typical down/upload speed from 2010 – 2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
4	1	50%
9	1	50%

Speed Test Upload Tier	Count	% of Tests
6	1	50%
7	1	50%

Computer based speed tests match reported typical speeds or are within 1 speed tier: Yes

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 1/110 (< 1%)

Typical down/upload speed from 2010 – 2012 mobile based speed test:

Speed Test Download Tier	Count	% of Tests
3	3	27%
4	1	9%
6	2	18%
7	5	45%

Speed Test Upload Tier	Count	% of Tests
1	1	9%
2	1	9%
3	2	18%
4	1	9%
5	1	9%
7	3	27%
8	1	9%
9	1	9%

Mobile based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 6/110 (5%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 51/110 (46%)
Number of tracts reported to FCC, but no census blocks reported to project: 8

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 1/110 (<1%)
Total number of dead zones reported per provider via broadband.maryland.gov: 1

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0/95 (0%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Change in coverage area from Fall 2012 Submission to Spring 2013 Submission: 15 census block increase

ALTIUS Communications, LLC

DBA: ALTIUS Broadband

Data Characteristics

Date of Original Submission:	1/23/2013
Date of Update Submission:	N/A
Currency of Data:	12/31/2012
FRN:	0016873374
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	2
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Remove coverage areas less than 0.125 square miles
- Remove coverage area "holes" less than 0.125 square miles
- Load coverage area into the NTIA data model
    - Result: BB_Service_Wireless

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
6	2	100%

Max Upload Category	Count	% of Area
3	2	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 - 2012 mobile based speed test: N/A

Mobile based speed tests match reported typical download speeds or are within 1 speed tier: N/A

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: N/A
Number of mobile speed tests reported outside coverage area: N/A

Form 477Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: N/A
#/% of tracts reported as served to FCC but do not intersect coverage area: N/A

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov:
3/303 (<1%)
Number of dead zones reported within coverage area via mdbroadbandmap.org:
0/101 (0%)

Web Search Verification: N/A

Wireless Verification: N/A

Anne Arundel Broadband

DBA Name: Anne Arundel Broadband

Data Characteristics

Date of Original Submission:	4/14/2010
Date of Update Submission:	3/14/2012
Currency of Data:	12/31/2012
FRN:	0003773843
Type of data submitted:	Address Table
Census Block Count:	2949
Total Matched Address Points Count:	107378
Unmatched Address Points:	100
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
  - Number matched: 103647
  - Number unmatched: 840
- Unmatched address are geocoded to Maryland Property View address locator
  - Number matched: 636
  - Number unmatched: 204
- Unmatched address are geocoded to Maryland street centerline address locator
  - Number matched: 636
  - Number unmatched: 204
- Merge matched addresses
- Spatially join address points to 2010 census blocks
- Select by location the address points that are completely within a greater than two square mile census block
  - Export as address points to be loaded into the NTIA data model
    - Result: BB_Service_Address
  - Switch the selection and export as points to create census blocks

Census Block Process:

- Join the switched selection (BB_Service_Address) address points to the 2010 census blocks based on the GEOID10 field
    - Export results Load exported results into the NTIA data model
        - Result: BB_Service_CensusBlock

Data Modification:

- Removed 2 addresses from data set – address out of provider area
    - Milford, MI
    - Cecil County, MD

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
7	2949	100%

Max Upload Category	Count	% of Blocks
4	2949	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 – 2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
3	3	5%
4	2	3%
5	9	16%
6	17	29%
7	23	40%
8	1	2%
9	2	3%
10	1	2%

Speed Test Upload Tier	Count	% of Tests
1	3	5%
2	4	7%
3	6	10%
4	45	78%

Computer based speed tests match reported typical download speeds or are within 1 speed tier: N/A

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 0/2949 (0%)

Typical down/upload speed from 2010 – 2012 mobile based speed test:

Speed Test Download Tier	Count	% of Tests
2	33	16%
3	23	11%

Speed Test Upload Tier	Count	% of Tests
1	77	38%
2	37	18%

4	42	21%
5	51	25%
6	27	13%
7	25	12%

3	9	4%
4	50	25%
5	28	14%

Mobile based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 19/2949 (< 1%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 215/2949 (7%)
Number of tracts reported to FCC, but no census blocks reported to project: 4

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0/2949 (0%)
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0/2949 (0%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: 17/2949 (1%) of census blocks were confirmed using online search feature of given provider

Anne Arundel WebSearch Verification Table	Count	Percentage
Total # of sample points	1496	
Number of sample points with results	85	6%
Result is yes and census block is in served area	17	20%
Result is yes but not in a census block reported as served	15	18%
Result is no and census block is in served area	0	0%
Result is no and census block not served area	53	62%

Change in coverage area from Fall 2012 Submission to Spring 2013 Submission: no change

Antietam Cable Television, Inc.

DBA Name: Antietam Cable Television, Inc

Data Characteristics

Date of Original Submission:	7/29/2010
Date of Update Submission:	3/8/2013
Currency of Data:	12/31/2012
FRN:	0002154367
Type of data submitted:	Addresses
Census Block Count:	2813
Total Matched Address Points Count:	62143
Unmatched Address Points:	319
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

***See ReadMe.txt**

Data Processing

Address Table Process:

- Geocode address table to Maryland Property View address locator
  - Number matched: 50443
  - Number unmatched: 12021
- Unmatched address are geocoded to ESRI US Streets address locator
  - Number matched: 10971
  - Number unmatched: 1050
- Unmatched addresses are geocoded to Maryland centerline address locator
  - Number matched: 731
  - Number unmatched: 319
- Merge matched addresses
- Spatially join address points to 2010 census blocks
- Select by location the address points that are completely within a greater than two square mile census block
  - Export as address points to be loaded into the NTIA data model
    - Result: BB_Service_Address
  - Switch the selection and export as points to create census blocks

Census Block Process:

- Join delivered tract table to 2010 census tracts, calculate provider fields, export results
  - Load results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
9	2813	100%

Max Upload Category	Count	% of Blocks
7	2813	100%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
9	2813	100%

Typical Upload Category	Count	% of Blocks
3	2813	100%

Typical down/upload speed from 2010 – 2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
2	1	0%
3	5	2%
4	35	16%
5	133	59%
6	15	7%
7	16	7%
8	6	3%
9	2	1%
10	11	5%

Speed Test Upload Tier	Count	% of Tests
1	1	0%
2	36	16%
3	139	62%
4	42	19%
5	2	1%
6	4	2%

Computer based speed tests match reported typical download speeds or are within 1 speed tier: No

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 5/2813 (< 1%)

Typical down/upload speed from 2010 – 2012 mobile speed test:

Speed Test Download Tier	Count	% of Tests
1	4	2%
2	9	3%
3	17	6%

Speed Test Upload Tier	Count	% of Tests
1	10	4%
2	18	7%
3	197	75%

4	58	22%
5	128	48%
6	38	14%
7	10	4%

4	35	13%
5	4	2%

Mobile speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 19/2813 (< 1%)

Form 477Verification:
Number of census blocks reported to project, but no tract reported to FCC: 6/2813 (< 1%)
Number of tracts reported to FCC, but no census blocks reported to project: 0

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 1/2813 (< 1%)
Total number of dead zones reported per provider via broadband.maryland.gov: 1

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0/2813 (0%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: 45/2813 (2%) of census blocks were confirmed using online search feature of given provider.

Antietam WebSearch Verification Table	Count	Percentage
Total # of sample points	1496	
Number of sample points with results	144	10%
Result is yes and census block is in served area	45	31%
Result is yes but not in a census block reported as served	3	2%
Result is no and census block is in served area	69	48%
Result is no and census block not served area	75	52%

Change in coverage area from Fall 2012 Submission to Spring 2013 Submission: 2775 census block decrease.

Armstrong Holdings, Inc.

DBA Name: Armstrong Utilities, Inc.

Data Characteristics

Date of Original Submission:	3/31/2010
Date of Update Submission:	3/7/2013
Currency of Data:	12/31/2012
FRN:	0003765617
Type of data submitted:	Census Block Table & Road Segments
Census Block Count:	2592
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	Yes

***See ReadMe.txt**

Data Processing

Census Block Process:

- Join the provided census block table to the 2010 census blocks based on the GEOID10 field
    - Export results
    - Load exported results into the NTIA data model
        - Result: BB_Service_CensusBlock

Road Segment Process:

- Create beginning and ending road segment addresses for all submitted road segments by concatenating the address number, street direction, street name, street type.
- Remove any duplicate addresses and those with no address number.
- Address-match those road segment addresses against the ArcGIS US Streets geocoding service to create beginning/ending road segment points
- Select those TIGER line segments that are within 10 m of a segment point location
- Spatial join the points to the TIGER lines so that the Technology of Transmission and Speed Tiers are attached to the appropriate line segment.
- Select just those line segments that intersect the census blocks that are greater than 2 square miles
    - Export results

- Load exported results into the NTIA data model
  - Result: BB_Service_RoadSegment

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
9	2592	100%

Max Upload Category	Count	% of Blocks
5	2592	100%

Road Segments

Max Download Category	Count	% of Road Segments
9	198	100%

Max Upload Category	Count	% of Road Segments
5	198	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 – 2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
2	12	13%
3	3	3%
4	3	3%
5	16	17%
6	47	50%
7	13	14%

Speed Test Upload Tier	Count	% of Tests
1	2	2%
2	9	10%
3	16	17%
4	63	67%
5	3	3%
6	1	1%

Computer based speed tests match reported typical download speeds or are within 1 speed tier: N/A

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 0/2592 (0%)

Typical down/upload speed from 2010 – 2012 mobile speed test:

Speed Test Download Tier	Count	% of Tests
1	33	11%
2	102	34%
3	39	13%
4	25	8%
5	39	13%
6	52	17%
7	13	4%

Speed Test Upload Tier	Count	% of Tests
1	47	16%
2	71	23%
3	42	14%
4	133	44%
5	10	3%

Mobile based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 10/2592 (< 1%)
Form 477Verification:
Number of census blocks reported to project, but no tract reported to FCC: 104/2592 (4%)
Number of tracts reported to FCC, but no census blocks reported to project: 3

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 10/2592 (< 1%)
Total number of dead zones reported per provider via broadband.maryland.gov: 10

Number or census blocks with dead zones reported via mdbroadbandmap.org: 2/2592 (<1%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 3

Web Search Verification: 46/2592 (2%) of census blocks were confirmed using online search feature of given provider

Armstrong WebSearch Verification Table	Count	Percentage
Total # of sample points	1496	
Number of sample points with results	166	11%
Result is yes and census block is in served area	46	28%
Result is yes but not in a census block reported as served	40	24.1%
Result is no and census block is in served area	0	0%
Result is no and census block not served area	80	48%

Change in coverage area from Fall 2012 Submission to Spring 2013 Submission: no change

AT&T Mobility LLC

DBA Name: AT&T Mobility LLC

Data Characteristics

Date of Original Submission:	3/9/2010
Date of Update Submission:	1/29/2013
Currency of Data:	12/31/2012
FRN:	0004979233
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	Yes
Provided Road Segments for census blocks greater than 2 sq miles:	No

***See ReadMe.txt**

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Remove coverage areas less than 0.125 square miles
- Remove coverage area "holes" less than 0.125 square miles
- Load coverage area into the NTIA data model
    - Result: BB_Service_Wireless

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
4	2	40%
5	2	40%
7	1	20%

Max Upload Category	Count	% of Area
3	2	40%
4	2	40%
5	1	20%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 - 2012 mobile based speed test:

Speed Test Download Tier	Count	% of Tests
1	195	15%
2	270	21%
3	383	30%
4	337	27%
5	67	5%
6	5	0%
7	6	0%

Speed Test Upload Tier	Count	% of Tests
1	701	56%
2	334	26%
3	174	14%
4	39	3%
5	7	1%
6	1	0%
7	4	0%
8	3	0%

Mobile based speed tests match reported typical download speeds or are within 1 speed tier: N/A

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: 1262/1263 (99.9%)
Number of mobile speed tests reported outside coverage area: 1/1263 (.08%)

Typical down/upload speed from 2010 computer based speed test:

Speed Test Download Tier	Count	% of Tests
1	4	40%
2	3	30%
3	2	20%
4	1	10%

Speed Test Upload Tier	Count	% of Tests
1	5	50%
2	2	20%
3	3	30%

#/% of computer based speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: 10/10 (100%)
Number of mobile speed tests reported outside coverage area: 0/10 (0%)

Form 477Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: 1391/1391 (100%)
#/% of tracts reported as served to FCC but do not intersect coverage area: 0/1391 (0%)

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov: 303/303 (100%)
Number of dead zones reported within coverage area via mdbroadbandmap.org: 101/101 (100%)

Web Search Verification: N/A

Wireless Verification: N/A

Atlantech Online, Inc.

DBA: Atlantech Online, Inc.

Data Characteristics

Date of Original Submission:	3/7/2011
Date of Update Submission:	3/13/2013
Currency of Data:	12/31/2012
FRN:	0018854935
Type of data submitted:	Address Table
Census Block Count:	22
Total Matched Address Points Count:	39
Unmatched Address Points:	0
Number of Technology of Transmission Types:	2
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Census Block Process:

- Geocode address table to ESRI US Streets address locator
  - Number matched: 39
  - Number unmatched: 0
- Spatially join matched address points to 2010 census blocks
- Separate addresses by technology of transmission

Census Block Process:

- Join the spatial join result to the 2010 census blocks based on the GEOID10 field for each technology
  - Export results for each technology
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
11	2	9%
7	20	91%

Max Upload Category	Count	% of Blocks
11	2	9%
7	20	91%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 – 2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
3	6	13%
4	1	2%
5	20	44%
6	10	22%
7	3	7%
8	2	4%
9	3	7%

Speed Test Upload Tier	Count	% of Tests
2	1	2%
3	10	22%
4	12	27%
5	11	24%
6	3	7%
7	4	9%
8	2	4%
9	2	4%

Computer based speed tests match reported typical speeds or are within 1 speed tier: N/A

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 10/22 (45%)

Typical down/upload speed from 2010 – 2012 mobile speed test:

Speed Test Download Tier	Count	% of Tests
1	2	13%
2	4	25%
3	5	31%
5	2	13%
6	3	19%
7	2	13%

Speed Test Upload Tier	Count	% of Tests
1	5	31%
2	3	19%
3	3	19%
5	2	13%
6	3	19%
7	2	13%

Mobile based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 13/22 (59%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 0/22 (0%)
Number of tracts reported to FCC, but no census blocks reported to project: 51

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 1/22 (< 1%)
Total number of dead zones reported per provider via broadband.maryland.gov: 2

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0/22 (0%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Change in coverage area from Fall 2012 Submission to Spring 2013 Submission: no change

Atlantic Broadband (Penn), LLC

DBA Name: Atlantic Broadband

Data Characteristics

Date of Original Submission:	3/26/2011
Date of Update Submission:	3/13/2013
Currency of Data:	12/31/2012
FRN:	0009596883
Type of data submitted:	Address Table
Census Block Count:	3870
Total Matched Address Points Count:	63765
Unmatched Address Points:	4183
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq. miles:	No

***See ReadMe.txt**

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
  - Number matched: 59443
  - Number unmatched: 8505
- Unmatched address are geocoded to Maryland Property View address locator
  - Number matched: 3282
  - Number unmatched: 5223
- Unmatched addresses are geocoded to Maryland center line address locator
  - Number matched: 1040
  - Number unmatched: 4183
- Merge matched addresses
- Spatially join address points to 2010 census blocks
- Select by location the address points that are completely within a greater than two square mile census block
  - Export as address points to be loaded into the NTIA data model
    - Result: BB_Service_Address
  - Switch the selection and export as points to create census blocks

Census Block Process:

- Join the switched selection (BB_Service_Address) address points to the 2010 census blocks based on the GEOID10 field
    - Export results Load exported results into the NTIA data model
        - Result: BB_Service_CensusBlock

Data Modification:

- Provider submitted 92 addresses with Category of End User of 3 - Small Business. The SBDD data model does not allow this code for addresses; the 92 addresses were changed to 5 – Other.

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
7	3870	100%

Max Upload Category	Count	% of Blocks
3	3611	93%
4	259	7%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
7	3870	100%

Typical Upload Category	Count	% of Blocks
3	3870	100%

Typical down/upload speed from 2010 – 2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
3	6	13%
4	1	2%
5	20	44%
6	10	22%
7	3	7%
8	2	4%
9	3	7%

Speed Test Upload Tier	Count	% of Tests
2	1	2%
3	10	22%
4	12	27%
5	11	24%
6	3	7%
7	4	9%
8	2	4%
9	2	4%

Computer based speed tests match reported typical download speeds or are within 1 speed tier: No

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 10/3870 (< 1%)

Typical down/upload speed from 2010 – 2012 mobile based speed test:

Speed Test Download Tier	Count	% of Tests
1	2	13%
2	4	25%
3	5	31%
5	2	13%
6	3	19%
7	2	13%

Speed Test Upload Tier	Count	% of Tests
1	5	31%
2	3	19%
3	3	19%
5	2	13%
6	3	19%
7	2	13%

Mobile based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 25/3870 (< 1%)

Form 477Verification:
Number of census blocks reported to project, but no tract reported to FCC: N/A
Number of tracts reported to FCC, but no census blocks reported to project: N/A

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 4/3870 (< 1%)
Total number of dead zones reported per provider via broadband.maryland.gov: 5

Number or census blocks with dead zones reported via mdbroadbandmap.org: 5/3870 (< 1%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 7

Web Search Verification: 78/3870 (2%) of census blocks were confirmed using online search feature of given provider

Atlantic Broadband WebSearch Verification Table	**Count**	**Percentage**
Total # of sample points	1496	
Number of sample points with results	1496	100%
Result is yes and census block is in served area	78	5%
Result is yes but not in a census block reported as served	122	8%
Result is no and census block is in served area	2	0%
Result is no and census block not served area	1290	86%

Change in coverage area from Fall 2012 Submission to Spring 2013 Submission: no change

Bay Country Communications, Inc.

DBA Name: **Bay Country Communications, Inc.**

Data Characteristics

Date of Original Submission:	8/9/2010
Date of Update Submission:	2/11/2013
Currency of Data:	12/31/2012
FRN:	0020136552
Type of data submitted:	Census Block Table
Census Block Count:	1841
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Census Block Process:

- Join the provided census block table to the 2010 census blocks based on the 2010 block name field
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
7	1841	100%

Max Upload Category	Count	% of Blocks
7	1841	100%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
4	1841	100%

Typical Upload Category	Count	% of Blocks
2	1841	100%

Typical down/upload speed from 2010 – 2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
3	2	100%

Speed Test Upload Tier	Count	% of Tests
2	2	100%

Computer based speed tests match reported typical download speeds or are within 1 speed tier: Yes

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 1/1841 (<1%)

Form 477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: N/A
Number of tracts reported to FCC, but no census blocks reported to project: N/A

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov:
1/1841 (<1%)
Total number of dead zones reported per provider via broadband.maryland.gov: 2

Number of census blocks with dead zones reported via mdbroadbandmap.org:
1/1841 (<1%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 3

Web Search Verification: N/A

Change in coverage area from Fall 2012 Submission to Spring 2013 Submission: no change

Believe Wireless, LLC.

DBA: Believe Wireless Broadband

Data Characteristics

Date of Original Submission:	3/1/2011
Date of Update Submission:	3/15/2013
Currency of Data:	12/31/2012
FRN:	9999
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

***See ReadMe.txt**

Data Processing

Coverage Area Process:

- Use raster analysis to extract coverage area from map
- Repair Geometry on coverage area
- Remove coverage areas less than 0.125 square miles
- Remove coverage area "holes" less than 0.125 square miles
- Simplify Polygon of coverage area
- Load coverage area into the NTIA data model
    - Result: BB_Service_Wireless

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
7	1	100%

Max Upload Category	Count	% of Area
7	1	100%

Typical down/upload speeds reported by provider:

Coverage Area

Typical Download Category	Count	% of Area
6	1	100%

Typical Upload Category	Count	% of Area
6	1	100%

Typical down/upload speed from 2010 - 2012 mobile speed test:

Speed Test Download Tier	Count	% of Tests
2	1	10%
3	1	10%
4	4	40%
5	3	30%
6	1	10%

Speed Test Upload Tier	Count	% of Tests
2	1	10%
3	1	10%
4	7	70%
5	1	10%

Mobile based speed tests match reported typical download speeds or are within 1 speed tier: No

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: 9/10 (90.0%)
Number of mobile speed tests reported outside coverage area: 1/10 (10%)

Form 477Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: N/A
#/% of tracts reported as served to FCC but do not intersect coverage area: N/A

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov: 18/303 (5.9%)
Number of dead zones reported within coverage area via mdbroadbandmap.org: 3/101 (2.9%)

Web Search Verification: N/A

Wireless Verification: N/A

Bloosurf

DBA: Bloosurf

Data Characteristics

Date of Original Submission:	2/28/2011
Date of Update Submission:	3/5/2013
Currency of Data:	12/31/2012
FRN:	0019496462
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Digitize coverage area from map, process delivered coverage areas
- Repair Geometry on coverage area
- Remove coverage areas less than 0.125 square miles
- Remove coverage area "holes" less than 0.125 square miles
- Load coverage area into the NTIA data model
    - Result: BB_Service_Wireless

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
5	1	100%

Max Upload Category	Count	% of Area
3	1	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 mobile speed test: N/A

Mobile based speed tests match reported typical download speeds or are within 1 speed tier: N/A

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: N/A
Number of mobile speed tests reported outside coverage area: N/A

Form 477Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: N/A
#/% of tracts reported as served to FCC but do not intersect coverage area: N/A

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov: 7/303 (2.3%)
Number of dead zones reported within coverage area via mdbroadbandmap.org: 1/101 (<1%)

Web Search Verification: N/A

Wireless Verification: N/A

Broadview Networks Holdings, Inc.

DBA Name: Broadview Networks Holdings, Inc.

Data Characteristics

Date of Original Submission:	2/24/2010
Date of Update Submission:	3/12/2013
Currency of Data:	12/31/2012
FRN:	0010296853
Type of data submitted:	Address Table
Census Block Count:	600
Total Matched Address Points Count:	797
Unmatched Address Points:	10
Number of Technology of Transmission Types:	3
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
  - Number matched: 786
  - Number unmatched: 23
- Unmatched address are geocoded to Maryland Property View address locator
  - Number matched: 12
  - Number unmatched: 11
- Unmatched address are geocoded to Maryland street centerline address locator
  - Number matched: 1
  - Number unmatched: 10
- Merge matched addresses
- Spatially join address points to 2010 census blocks
- Separate and export the address points according to technology of transmission

Census Block Process:

- Join the address points to the 2010 census blocks based on the GEOID10 field
  - Export results for each technology of transmission
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
3	20	3%
4	496	81%
5	84	14%
6	11	2%

Max Upload Category	Count	% of Blocks
2	37	6%
3	33	5%
4	459	75%
5	72	12%
6	10	2%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 – 2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
2	1	17%
3	2	33%
5	1	17%
6	1	17%
9	1	17%

Speed Test Upload Tier	Count	% of Tests
2	2	33%
3	2	33%
5	2	33%

Computer based speed tests match reported typical download speeds or are within 1 speed tier: N/A

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 2/600 (<1%)

Typical down/upload speed from 2010 – 2012 mobile based speed test:

Speed Test Download Tier	Count	% of Tests
3	2	29%
4	4	57%
5	1	14%

Speed Test Upload Tier	Count	% of Tests
3	1	14%
4	5	71%
5	1	14%

Mobile based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 4/600 (<1%)

Form 477Verification:
Number of census blocks reported to project, but no tract reported to FCC: 83/600 (13.8%)
Number of tracts reported to FCC, but no census blocks reported to project: 57

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0/600 (0%)
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 1/600 (<1%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 1

Web Search Verification: N/A

Change in coverage area from Fall 2012 Submission to Spring 2013 Submission: no change

Brookwood Ventures LLC

DBA Name: Brookwood Ventures LLC

Data Characteristics

Date of Original Submission:	3/12/2010
Date of Update Submission:	N/A
Currency of Data:	12/31/2011
FRN:	0018426684
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Remove coverage areas less than 0.125 square miles
- Remove coverage area "holes" less than 0.125 square miles
- Load coverage area into the NTIA data model
    - Result: BB_Service_Wireless

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
5	1	100%

Max Upload Category	Count	% of Area
3	1	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010-2012 mobile speed test:

Speed Test Download Tier	Count	% of Tests
4	1	100%

Speed Test Upload Tier	Count	% of Tests
2	1	100%

Mobile based speed tests match reported typical download speeds or are within 1 speed tier: N/A

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: 1/1 (100%)
Number of mobile speed tests reported outside coverage area: 0/1 (0%)

Form 477Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: 1/1 (100%)
#/% of tracts reported as served to FCC but do not intersect coverage area: 0/1 (0%)

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov: 1/303 (<1%)
Number of dead zones reported within coverage area via mdbroadbandmap.org: 1/101 (<1%)

Web Search Verification: N/A

Wireless Verification: N/A

Cavalier Telephone Mid-Atlantic, LLC

DBA Name: Cavalier Telephone Mid-Atlantic, LLC

Data Characteristics

Date of Original Submission:	3/10/2010
Date of Update Submission:	N/A
Currency of Data:	12/31/2012
FRN:	0015799133
Type of data submitted:	Addresses, Middle Mile
Census Block Count:	6856
Total Matched Address Points Count:	10263
Unmatched Address Points:	34
Number of Technology of Transmission Types:	2
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	Yes
Provided Road Segments for census blocks greater than 2 sq miles:	No

***See ReadMe.txt**

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
  - Number matched: 10212
  - Number unmatched: 85
- Unmatched address are geocoded to Maryland Property View address locator
  - Number matched: 42
  - Number unmatched: 43
- Unmatched addresses are geocoded to Maryland center line address locator
  - Number matched: 9
  - Number unmatched: 34
- Merge matched addresses
- Spatially join address points to 2010 census blocks
- Separate and export the address points according to technology of transmission

Census Block Process:

- Join the address points to the 2010 census blocks based on the GEOID10 field
  - Export results for each technology of transmission
  - Load exported results into the NTIA data model

- Result: BB_Service_CensusBlock

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Area
8	6856	100%

Max Upload Category	Count	% of Area
8	6856	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 – 2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
1	2	1%
2	35	19%
3	35	19%
4	32	17%
5	44	24%
6	22	12%
7	11	6%
8	3	2%
10	1	1%

Speed Test Upload Tier	Count	% of Tests
1	17	9%
2	115	62%
3	42	23%
4	1	1%
5	3	2%
6	4	2%
7	3	2%

Computer based speed tests match reported typical download speeds or are within 1 speed tier: N/A

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 20/6856 (< 1%)

Typical down/upload speed from 2010 – 2012 mobile based speed test:

Speed Test Download Tier	Count	% of Tests
1	17	14%
2	22	19%
3	17	14%
4	24	20%
5	34	29%
6	3	3%
7	1	1%

Speed Test Upload Tier	Count	% of Tests
1	17	14%
2	55	47%
3	21	18%
4	19	16%
5	3	3%
6	2	2%
7	1	1%

Mobile based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): N/A

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: N/A
Number of tracts reported to FCC, but no census blocks reported to project: N/A

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 13/6856 (< 1%)
Total number of dead zones reported per provider via broadband.maryland.gov: 9

Number of census blocks with dead zones reported via mdbroadbandmap.org: 2/6856 (< 1%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 2

Web Search Verification: 20/6856 (1%) of census blocks were confirmed using online search feature of given provider

Cavalier WebSearch Verification Table	Count	Percentage
Total # of sample points	1496	
Number of sample points with results	432	29%
Result is yes and census block is in served area	20	5%
Result is yes but not in a census block reported as served	47	11%
Result is no and census block is in served area	26	6%
Result is no and census block not served area	339	78%

Change in coverage area from Fall 2012 Submission to Spring 2013 Submission: no change

Cellco Partnership and its Affiliated Entities

DBA Name: Verizon Wireless

Data Characteristics

Date of Original Submission:	3/8/2010
Date of Update Submission:	1/22/2013
Currency of Data:	12/31/2012
FRN:	0003290673
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

***See ReadMe.txt**

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Remove coverage areas less than 0.125 square miles
- Remove coverage area "holes" less than 0.125 square miles
- Load coverage area into the NTIA data model
    - Result: BB_Service_Wireless

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
3	3	75%
7	1	25%

Max Upload Category	Count	% of Area
2	3	75%
5	1	25%

Typical down/upload speeds reported by provider:

Coverage Area

Typical Download Category	Count	% of Area
3	3	75%

Typical Upload Category	Count	% of Area
2	3	75%

6	1	25%

5	1	25%

Typical down/upload speed from 2010-2012 mobile speed test:

Speed Test Download Tier	Count	% of Tests
1	857	16%
2	1830	35%
3	1614	30%
4	910	17%
5	36	1%
6	24	0%
7	29	1%
8	3	0%

Speed Test Upload Tier	Count	% of Tests
1	1150	22%
2	3295	62%
3	699	13%
4	68	1%
5	40	1%
6	8	0%
7	22	0%
8	21	0%

Mobile based speed tests match reported typical download speeds or are within 1 speed tier: Yes

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: 5146/5303 (97.0%)
Number of mobile speed tests reported outside coverage area: 157/5303 (2.9%)

Typical down/upload speed from 2010-2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
1	43	10%
2	197	48%
3	130	31%
4	43	10%
5	1	0%

Speed Test Upload Tier	Count	% of Tests
1	129	31%
2	282	68%
3	2	0%
4	1	0%

#/% of computer based speed tests verifying coverage area:
Number of computer based speed tests reported inside coverage area: 408/414 (98.6%)
Number of computer based speed tests reported outside coverage area: 6/414 (1.5%)

Form 477 Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: N/A
#/% of tracts reported as served to FCC but do not intersect coverage area: N/A

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov: 275/303 (90.7%)
Number of dead zones reported within coverage area via mdbroadbandmap.org: 95/101 (94%)

Web Search Verification: N/A

Wireless Verification: N/A

CHARTER COMMUNICATIONS INC.

DBA Name: CHARTER COMMUNICATIONS INC.

Data Characteristics

Date of Original Submission:	3/31/2010
Date of Update Submission:	1/24/2013
Currency of Data:	12/31/2012
FRN:	0017179383
Type of data submitted:	Census Block Table, Road Segments
Census Block Count:	476
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq. miles:	Yes

***See ReadMe.txt**

Data Processing

Census Block Process:

- Join the provided census block table to the 2010 census blocks based on the 2010 block name field
    - Export results
    - Load exported results into the NTIA data model
        - Result: BB_Service_CensusBlock

Road Segment Process:

- Join road segments to TigerLine by TLID, remove driveways
    - Export results
    - Load exported results into the NTIA data model
        - Result: BB_Service_RoadSegment

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
10	476	100%

Max Upload Category	Count	% of Blocks
5	476	100%

Road Segments

Max Download Category	Count	% of Road Segments
10	37	100%

Max Upload Category	Count	% of Road Segments
5	37	100%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
9	476	100%

Typical Upload Category	Count	% of Blocks
5	476	100%

Road Segments

Typical Download Category	Count	% of Road Segments
9	37	100%

Typical Upload Category	Count	% of Road Segments
5	37	100%

Typical down/upload speed from 2010 – 2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
4	4	57%
5	2	29%
7	1	14%

Speed Test Upload Tier	Count	% of Tests
2	3	43%
3	4	57%

Computer based speed tests match reported typical download speeds or are within 1 speed tier: No

Computer bases speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 0/476 (0%)

Typical down/upload speed from 2010 – 2012 mobile based speed test:

Speed Test Download Tier	Count	% of Tests
1	4	19%
2	1	5%
3	3	14%
4	5	24%
5	5	24%
6	2	10%
7	1	5%

Speed Test Upload Tier	Count	% of Tests
1	1	5%
2	10	48%
3	3	14%
4	4	19%
5	3	14%

Mobile bases speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 7/476 (1%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 0/421 (0%)
Number of tracts reported to FCC, but no census blocks reported to project: 0

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0/421 (0%)
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0/421 (0%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: 2/421 (<1%) of census blocks were confirmed using online search feature of given provider

Charter WebSearch Verification Table	Count	Percentage
Total # of sample points	1496	
Number of sample points with results	55	4%
Result is yes and census block is in served area	2	4%
Result is yes but not in a census block reported as served	0	0%
Result is no and census block is in served area	3	5%
Result is no and census block not served area	50	91%

Change in coverage area from Fall 2012 Submission to Spring 2013 Submission: 55 census block increase

Clearwire Corporation

DBA Name: Clear

Data Characteristics

Date of Original Submission:	3/5/2010
Date of Update Submission:	2/12/2013
Currency of Data:	12/31/2012
FRN:	0017775628
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Provider requested to not have Maryland's standard wireless processing applied
- Load coverage area into the NTIA data model
  - Result: BB_Service_Wireless

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
5	1	100%

Max Upload Category	Count	% of Area
4	1	100%

Typical down/upload speeds reported by provider:

Coverage Area

Typical Download Category	Count	% of Area
5	1	100%

Typical Upload Category	Count	% of Area
4	1	100%

Typical down/upload speed from 2010-2012 mobile speed test:

Speed Test Download Tier	Count	% of Tests
1	857	16%
2	1830	35%
3	1614	30%
4	910	17%
5	36	1%
6	24	0%
7	29	1%
8	3	0%

Speed Test Upload Tier	Count	% of Tests
1	1150	22%
2	3295	62%
3	699	13%
4	68	1%
5	40	1%
6	8	0%
7	22	0%
8	21	0%

Mobile based speed tests match reported typical download speeds or are within 1 speed tier: No

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: 536/649 (82.5%)
Number of mobile speed tests reported outside coverage area: 113/649 (17.4%)

Typical down/upload speed from 2010-2012 computer based speed test:

Coverage Area

Max Download Category	Count	% of Area
5	1	100%

Max Upload Category	Count	% of Area
4	1	100%

#/% of computer based speed tests verifying coverage area:
Number of computer based speed tests reported inside coverage area: 123/132 (93.2%)
Number of computer based speed tests reported outside coverage area: 9/132 (6.8%)

Form 477 Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: 1011/1022 (99%)
#/% of tracts reported as served to FCC but do not intersect coverage area: 11/1022 (1%)

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov: 40/303 (13.2%)
Number of dead zones reported within coverage area via mdbroadbandmap.org: 3/101 (2.9%)

Web Search Verification: N/A

Wireless Verification: N/A

Cogent Communications Group

DBA Name: Cogent Communications Group

Data Characteristics

Date of Original Submission:	2/1/2010
Date of Update Submission:	2/11/2013
Currency of Data:	12/31/2012
FRN:	0019066034
Type of data submitted:	Address Table
Census Block Count:	9
Total Matched Address Points Count:	3
Unmatched Address Points:	3
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	Yes
Provided Road Segments for census blocks greater than 2 sq. miles:	No

Data Processing

Address Table Process:

- Geocode address table to Maryland Property View address locator
  - Number matched: 8
  - Number unmatched: 1
- Geocode unmatched addresses to ESRI US Streets address locator
  - Number matched: 1
  - Number unmatched: 0
- Spatially join address points to 2010 census blocks

Census Block Process:

- Join the address points to the 2010 census blocks based on the GEOID10 field
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks

Max Upload Category	Count	% of Blocks

11	9	100%	11	9	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 – 2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
2	9	24%
3	8	21%
4	4	11%
5	6	16%
6	8	21%
7	2	5%
8	1	3%

Speed Test Upload Tier	Count	% of Tests
1	2	5%
2	6	16%
3	12	32%
4	4	11%
5	2	5%
6	9	24%
7	3	8%

Computer based speed tests match reported typical download speeds or are within 1 speed tier: N/A

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 16/9 (> 100%)

Typical down/upload speed from 2010 – 2012 mobile based speed test:

Speed Test Download Tier	Count	% of Tests
1	13	12%
2	14	13%
3	25	23%
4	36	33%
5	5	5%
6	2	2%
7	14	13%

Speed Test Upload Tier	Count	% of Tests
1	8	7%
2	11	10%
3	13	12%
4	45	41%
5	20	18%
6	3	3%
7	9	8%

Mobile based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 29/9 (> 100%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 3/9 (33%)
Number of tracts reported to FCC, but no census blocks reported to project: 1

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0/9 (0%)
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0/9 (0%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Change in coverage area from Fall 2012 Submission to Spring 2013 Submission: 5 census block increase

Comcast Corporation

DBA Name: Comcast Cable Communications, LLC

Data Characteristics

Date of Original Submission:	1/19/2010
Date of Update Submission:	2/12/2012
Currency of Data:	12/31/2011
FRN:	0004441663
Type of data submitted:	Census Block Table, Road Segments
Census Block Count:	66120
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	Yes

***See Readme.txt**

Data Processing

Census Block Process:

- Join the census block table to the 2010 census blocks based on the GEOID10 field
  - Export results for each technology of transmission
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Road Segment Process:

- Create beginning and ending road segment addresses for all submitted road segments by concatenating the address number, street direction, street name, street type.
- Remove any duplicate addresses and those with no address number.
- Address-match those road segment addresses against the ArcGIS US Streets geocoding service to create beginning/ending road segment points
- Select those TIGER line segments that are within 10 m of a segment point location
- Spatial join the points to the TIGER lines so that the Technology of Transmission and Speed Tiers are attached to the appropriate line segment.
- Select just those line segments that intersect the census blocks that are greater than 2 square miles

- Export results
- Load exported results into the NTIA data model
  - Result: BB_Service_RoadSegment

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
10	66120	100%

Max Upload Category	Count	% of Blocks
7	66120	100%

Road Segments

Max Download Category	Count	% of Blocks
10	2281	100%

Max Upload Category	Count	% of Blocks
7	2281	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 – 2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
1	8	0%
2	65	1%
3	171	3%
4	140	2%
5	541	8%
6	873	13%
7	4283	65%
8	435	7%
9	77	1%
10	17	0%

Speed Test Upload Tier	Count	% of Tests
1	40	1%
2	223	3%
3	372	6%
4	1333	20%
5	4192	63%
6	356	5%
7	89	1%
8	4	0%
9	1	0%

Speed tests match reported typical download speeds or are within 1 speed tier: N/A

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 62/66120 (<1%)

Typical down/upload speed from 2010 – 2012 mobile speed test:

Speed Test Download Tier	Count	% of Tests
1	342	2%
2	580	3%

Speed Test Upload Tier	Count	% of Tests
1	491	2%
2	828	4%

3	668	3%
4	1284	6%
5	2577	12%
6	3747	18%
7	10669	52%
8	838	4%
9	5	0%

3	1233	6%
4	2726	13%
5	10284	50%
6	2985	14%
7	2110	10%
8	51	0%
9	1	0%
10	1	0%

Mobile speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 452/66120 (<1%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 345/66120 (<1%)
Number of tracts reported to FCC, but no census blocks reported to project: 3

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 119/66120 (< 1%)
Total number of dead zones reported per provider via broadband.maryland.gov: 174

Number of census blocks with dead zones reported via mdbroadbandmap.org: 45/66120 (< 1%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 43

Web Search Verification:
478/66120 (<1%) of census blocks were confirmed using online search feature of given provider

Comcast WebSearch Verification Table	Count	Percentage
Total # of sample points	1496	
Number of sample points with results	1016	68%
Result is yes and census block is in served area	478	47%
Result is yes but not in a census block reported as served	249	25%
Result is no and census block is in served area	0	0%
Result is no and census block not served area	285	28%

Change in coverage area from Fall 2012 Submission to Spring 2013 Submission: 10826 census block increase

Easton Utilities Commission

DBA Name: Easton Utilities Commission

* Easton Utilities Commission provides wireline and wireless service

Data Characteristics

Date of Original Submission:	2/5/2010
Date of Update Submission:	2/11/2013
Currency of Data:	12/31/2012
FRN:	0003793726
Type of data submitted:	Addresses, Tracts, Coverage Area
Census Block Count:	1499
Total Matched Address Points Count:	4687
Unmatched Address Points:	3
Number of Technology of Transmission Types:	2
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

***See ReadMe.txt**

Wireline Data Processing

Address Table Process:

- Geocode address table to ESRI address locator
  - Number matched: 4316
  - Number unmatched: 374
- Unmatched address are geocoded to MDPV address locator
  - Number matched: 367
  - Number unmatched: 7
- Unmatched address are geocoded to Maryland street centerline address locator
  - Number matched: 4
  - Number unmatched: 3
- Merge matched addresses
- Spatially join address points to 2010 census blocks
- Select by location the address points that are completely within a greater than two square mile census block
  - Export as address points to be loaded into the NTIA data model

- Result: BB_Service_Address
- Switch the selection and export as points to create census blocks

Census Block Process:

- Join delivered tract table to 2010 census tracts, calculate provider fields, export results
  - Load results into the NTIA data model
    - Result: BB_Service_CensusBlock

Wireline Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
9	1499	100%

Max Upload Category	Count	% of Blocks
6	1499	100%

Typical down/upload speeds reported by provider:

Typical Download Category	Count	% of Blocks
9	1499	100%

Typical Upload Category	Count	% of Blocks
3	1499	100%

Typical down/upload speed from 2010-2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
2	4	4%
3	12	11%
4	10	10%
5	56	53%
6	22	21%
7	1	1%

Speed Test Upload Tier	Count	% of Tests
1	12	11%
2	58	55%
3	31	30%
4	3	3%
5	1	1%

Computer based speed tests match reported typical download speeds or are within 1 speed tier: No

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 0/1499 (0%)

Typical down/upload speed from 2010-2012 mobile based speed test:

Speed Test Download Tier	Count	% of Tests
1	1	2%
2	2	4%
3	1	2%
4	3	6%
5	8	16%
6	29	59%
7	2	4%

Speed Test Upload Tier	Count	% of Tests
1	8	16%
2	10	20%
3	16	33%
4	10	20%
5	2	4%
7	3	6%

8	3	6%

Mobile speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 1/1499 (<1%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 441/1499 (29%)
Number of tracts reported to FCC, but no census blocks reported to project: 0

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0/1499 (0%)
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 4/1499 (<1%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 3

Web Search Verification: N/A

Change in coverage area from Fall 2012 Submission to Spring 2013 Submission: no change

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Wireless Data Processing

Coverage Area Process:

- Digitize delivered map
- Repair Geometry on delivered coverage area
- Load coverage area into the NTIA data model
    - Result: BB_Service_Wireless

Wireless Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
3	1	100%

Max Upload Category	Count	% of Area
2	1	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010-2012 mobile speed test:

Speed Test Download Tier	Count	% of Tests
1	1	2%
2	2	4%
3	1	2%

Speed Test Upload Tier	Count	% of Tests
1	8	16%
2	10	20%
3	16	33%

4	3	6%
5	8	16%
6	29	59%
7	2	4%
8	3	6%

4	10	20%
5	2	4%
7	3	6%

Mobile based speed tests match reported typical download speeds or are within 1 speed tier: N/A

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: 48/49 (98%)
Number of mobile speed tests reported outside coverage area: 1/49 (2.0%)

Form 477 Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: 3 /3 (100%)
#/% of tracts reported as served to FCC but do not intersect coverage area: 0/3 (0%)

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov: 0/303 (0%)
Number of dead zones reported within coverage area via mdbroadbandmap.org: 0/101 (0%)

Web Search Verification: N/A

Wireless Verification: N/A

FiberLight LLC

DBA Name: FiberLight LLC

Data Characteristics

Date of Original Submission:	3/31/2010
Date of Update Submission:	N/A
Currency of Data:	12/31/2011
FRN:	0014117139
Type of data submitted:	Census Block Table
Census Block Count:	1128
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Census Block Process:

- Join census block table to the 2010 census blocks based on the GEOID10 field
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
10	1128	100%

Max Upload Category	Count	% of Blocks
10	1128	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 – 2012 computer based speed test: N/A

Computer based speed tests match reported typical download speeds or are within 1 speed tier: N/A

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): N/A

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: N/A
Number of tracts reported to FCC, but no census blocks reported to project: N/A

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0/1128 (0%)
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0/1128 (0%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Change in coverage area from Fall 2012 Submission to Spring 2013 Submission: no change

Freedom Wireless Broadband, LLC

DBA Name: Freedom Wireless Broadband, LLC

Data Characteristics

Date of Original Submission:	1/28/2010
Date of Update Submission:	3/11/2013
Currency of Data:	12/31/2012
FRN:	0018643155
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Process delivered coverage area
- Repair Geometry on coverage area
- Remove coverage areas less than 0.125 square miles
- Remove coverage area "holes" less than 0.125 square miles
- Simplify Polygon of coverage area
- Load coverage area into the NTIA data model
    - Result: BB_Service_Wireless

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
4	1	100%

Max Upload Category	Count	% of Area
4	1	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010-2012 mobile speed test: N/A

Mobile based speed tests match reported typical download speeds or are within 1 speed tier: N/A

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: N/A
Number of mobile speed tests reported outside coverage area: N/A

Form 477 Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: 17 /17 (100%)
#/% of tracts reported as served to FCC but do not intersect coverage area: 0/17 (0%)

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov: 13/303 (4.2%)
Number of dead zones reported within coverage area via mdbroadbandmap.org: 4/101 (3.9%)

Web Search Verification: N/A

Wireless Verification: N/A

Gans Communications, LP

DBA: MetroCast Communications

Data Characteristics

Date of Original Submission:	3/5/2010
Date of Update Submission:	3/8/2013
Currency of Data:	12/31/2012
FRN:	0016642761
Type of data submitted:	Tracts
Census Block Count:	2467
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	Yes

***See ReadMe.txt**

Data Processing

Census Block Process:

- Join the census block table to the 2010 census blocks based on the GEOID10 field
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Road Segment Process:

- Join road segments to 2009 TigerLine by TLID
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_RoadSegment

Data Verification

Maximum down/upload speeds reported by provider:

Max Download Category	Count	% of Blocks
9	2467	100%

Max Upload Category	Count	% of Blocks
4	886	36%
5	1581	64%

Road Segments

Max Download Category	Count	% of Segments
9	800	100%

Max Upload Category	Count	% of Segments
4	228	29%
5	572	72%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
6	2467	100%

Typical Upload Category	Count	% of Blocks
2	2467	100%

Road Segments

Typical Download Category	Count	% of Segments
9	800	100%

Typical Upload Category	Count	% of Segments
2	800	100%

Typical down/upload speed from 2010-2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
3	3	4%
4	9	13%
5	12	18%
6	26	39%
7	17	25%

Speed Test Upload Tier	Count	% of Tests
1	18	27%
2	31	46%
3	16	24%
4	2	3%

Computer based speed tests match reported typical download speeds or are within 1 speed tier: Yes

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 1/2467 (< 1%)

Typical down/upload speed from 2010-2012 mobile based speed test:

Speed Test Download Tier	Count	% of Tests
1	6	5%
3	7	6%
4	11	9%
5	19	15%
6	32	26%
7	50	40%

Speed Test Upload Tier	Count	% of Tests
1	7	6%
2	20	16%
3	45	36%
4	51	41%
5	2	2%

Mobile based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 3/2467 (< 1%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: N/A
Number of tracts reported to FCC, but no census blocks reported to project: N/A

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 8/2467 (< 1%)
Total number of dead zones reported per provider via broadband.maryland.gov: 10

Number of census blocks with dead zones reported via mdbroadbandmap.org: 2/2467 (< 1%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 7

Web Search Verification: 36/2467 (2%) of census blocks were confirmed using online search feature of given provider

MetroCast Web Search Verification Table	Count	Percentage
Total # of sample points	1496	
Number of sample points with results	107	7%
Result is yes and census block is in served area	36	34%
Result is yes but not in a census block reported as served	20	19%
Result is no and census block is in served area	1	1%
Result is no and census block not served area	50	47%

Change in coverage area from Fall 2012 Submission to Spring 2013 Submission: no change

HNS License Sub, LLC

DBA: Hughes Communications, Inc.

Data Characteristics

Date of Original Submission:	2/2/2010
Date of Update Submission:	2/11/2013
Currency of Data:	12/31/2012
FRN:	0018483073
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Remove coverage areas less than 0.125 square miles
- Remove coverage area "holes" less than 0.125 square miles
- Load coverage area into the NTIA data model
    - Result: BB_Service_Wireless

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
7	1	100%

Max Upload Category	Count	% of Area
4	1	100%

Typical down/upload speeds reported by provider:

Typical Download Category	Count	% of Area
3	1	100%

Typical Upload Category	Count	% of Area
2	1	100%

Typical down/upload speed from 2010-2012 mobile speed test:

Speed Test Download Tier	Count	% of Tests
1	30	30%
2	42	42%
3	11	11%
4	9	9%
5	7	7%
6	1	1%

Speed Test Upload Tier	Count	% of Tests
1	23	23%
2	47	47%
3	8	8%
4	9	9%
5	11	11%
7	2	2%

Mobile based speed tests match reported typical download speeds or are within 1 speed tier: Yes

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: 100/100 (100%)
Number of mobile speed tests reported outside coverage area: 0/100 (0.0%)

Typical down/upload speed from 2010-2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
2	11	10%
3	39	35%
4	1	1%
5	3	3%
6	23	21%
7	27	25%
8	5	5%
9	1	1%

Speed Test Upload Tier	Count	% of Tests
1	23	21%
2	39	35%
3	21	19%
4	10	9%
5	4	4%
6	9	8%
7	3	3%
8	1	1%

#/% of computer based speed tests verifying coverage area:
Number of computer based speed tests reported inside coverage area: 110/110 (100%)
Number of computer based speed tests reported outside coverage area: 0/110 (0.0%)

Form477 Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: N/A
#/% of tracts reported as served to FCC but do not intersect coverage area: N/A

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov: 303/303 (100%)
Number of dead zones reported within coverage area via mdbroadbandmap.org: 101/101 (100%)

Web Search Verification: N/A

Wireless Verification: N/A

Hotwire Communications, Ltd

DBA Name: Hotwire Communications, Ltd

Data Characteristics

Date of Original Submission:	2/19/2010
Date of Update Submission:	1/14/2012
Currency of Data:	12/31/2011
FRN:	0009846494
Type of data submitted:	Addresses
Census Block Count:	1
Total Matched Address Points Count:	1
Unmatched Address Points:	0
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
  - Number matched: 1
  - Number unmatched: 0
- Spatially join address points to 2010 census blocks

Census Block Process:

- Join the address points to the 2010 census blocks based on the GEOID10 field
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
5	1	100%

Max Upload Category	Count	% of Blocks
3	1	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 – 2012 computer based speed test: N/A

Computer based speed tests match reported typical download speeds or are within 1 speed tier: N/A

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): N/A

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: N/A
Number of tracts reported to FCC, but no census blocks reported to project: N/A

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Change in coverage area from Fall 2012 Submission to Spring 2013 Submission: no change

Leap Wireless International, Inc

DBA: Cricket Communications

Data Characteristics

Date of Original Submission:	3/17/2010
Date of Update Submission:	3/7/2013
Currency of Data:	12/31/2012
FRN:	0002963528
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Remove coverage areas less than 0.125 square miles
- Remove coverage area "holes" less than 0.125 square miles
- Load coverage area into the NTIA data model
    - Result: BB_Service_Wireless

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
3	1	100%

Max Upload Category	Count	% of Area
2	1	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010-2012 mobile speed test:

Speed Test Download Tier	Count	% of Tests
1	64	70%

Speed Test Upload Tier	Count	% of Tests
1	23	25%

2	20	22%
3	3	3%
4	5	5%

2	54	59%
3	12	13%
7	1	1%
8	2	2%

Mobile based speed tests match reported typical download speeds or are within 1 speed tier: N/A

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: 92/92 (100%)
Number of mobile speed tests reported outside coverage area: 0/92 (0.0%)

Typical down/upload speed from 2010-2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
3	1	100%

Speed Test Upload Tier	Count	% of Tests
2	1	100%

#/% of computer based speed tests verifying coverage area:
Number of computer based speed tests reported inside coverage area: 1/1 (100%)
Number of computer based speed tests reported outside coverage area: 0/1 (0.0%)

Form 477 Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: 1146/1146 (100%)
#/% of tracts reported as served to FCC but do not intersect coverage area: 0/1146 (0.0%)

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov: 131/303 (43.2%)
Number of dead zones reported within coverage area via mdbroadbandmap.org: 30/101 (29.7%)

Web Search Verification: N/A

Wireless Verification: N/A

Level 3 Communications, LLC

DBA Name: Level 3 Communications, LLC

Data Characteristics

Date of Original Submission:	1/18/2010
Date of Update Submission:	3/4/2013
Currency of Data:	12/31/2012
FRN:	0003723822
Type of data submitted:	Address Table, Middle Mile
Census Block Count:	479
Total Matched Address Points Count:	715
Unmatched Address Points:	15
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	Yes
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Address Table Process:

- Geocode address table to Maryland Property View address locator
  - Number matched: 512
  - Number unmatched: 216
- Unmatched address are geocoded to ESRI US Streets address locator
  - Number matched: 191
  - Number unmatched: 25
- Unmatched address are geocoded to Maryland centerline address locator
  - Number matched: 10
  - Number unmatched: 15
- Merge matched addresses
- Spatially join address points to 2010 census blocks
- Select by location the address points that are completely within a greater than two square mile census block
  - Export as address points to be loaded into the NTIA data model
    - Result: BB_Service_Address
  - Switch the selection and export as points to create census blocks

Census Block Process:

- Join the switched selection (BB_Service_Address) address points to the 2010 census blocks based on the GEOID10 field
    - Export results Load exported results into the NTIA data model
        - Result: BB_Service_CensusBlock

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
11	479	100%

Max Upload Category	Count	% of Blocks
11	479	100%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
11	479	100%

Typical Upload Category	Count	% of Blocks
11	479	100%

Typical down/upload speed from 2010 – 2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
1	35	32%
2	4	4%
3	22	20%
4	6	6%
5	7	6%
6	5	5%
7	13	12%
8	13	12%
9	3	3%
10	1	1%

Speed Test Upload Tier	Count	% of Tests
1	20	18%
2	28	26%
3	21	19%
4	11	10%
5	5	5%
6	12	11%
7	10	9%
8	2	2%

Computer based speed tests match reported typical download speeds or are within 1 speed tier: No

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 55/479 (11.5%)

Typical down/upload speed from 2010 – 2012 mobile based speed test:

Speed Test Download Tier	Count	% of Tests
1	2	0.047619048
3	8	0.19047619

Speed Test Upload Tier	Count	% of Tests
1	2	5%
2	3	7%

4	7	0.166666667
5	11	0.261904762
6	8	0.19047619
7	6	0.142857143

3	8	19%
4	6	14%
5	7	17%
6	12	29%
7	3	7%
8	1	2%

Mobile based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 20/479 (4%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 229/479 (48%)
Number of tracts reported to FCC, but no census blocks reported to project: 36

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 2/479 (< 1%)
Total number of dead zones reported per provider via broadband.maryland.gov: 3

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0/170 (0%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Change in coverage area from Fall 2012 Submission to Spring 2013 Submission: 309 census block increase

Mediacom Communications

DBA: Mediacom Delaware LLC

Data Characteristics

Date of Original Submission:	8/4/2011
Date of Update Submission:	1/28/2013
Currency of Data:	12/31/2012
FRN:	0003572633
Type of data submitted:	Addresses
Census Block Count:	526
Total Matched Address Points Count:	11418
Unmatched Address Points:	253
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

***See ReadMe.txt**

Data Processing

Address Table Process:

- Geocode address table to Maryland Property View address locator
  - Number matched: 10810
  - Number unmatched: 863
- Unmatched address are geocoded to ESRI US Streets address locator
  - Number matched: 525
  - Number unmatched: 335
- Unmatched addresses are geocoded to Maryland center line address locator
  - Number matched: 85
  - Number unmatched: 253
- Merge matched addresses
- Spatially join address points to 2010 census blocks

Census Block Process:

- Join the address points to the 2010 census blocks based on the GEOID10 field
  - Export results Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
9	526	100%

Max Upload Category	Count	% of Blocks
3	526	100%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
9	526	100%

Typical Upload Category	Count	% of Blocks
3	526	100%

Typical down/upload speed from 2010 – 2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
2	1	2%
4	9	18%
5	5	10%
6	15	30%
7	20	40%

Speed Test Upload Tier	Count	% of Tests
2	6	12%
3	31	62%
4	11	22%
5	2	4%

Computer based speed tests match reported typical download speeds or are within 1 speed tier: No

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 0/526 (0%)

Typical down/upload speed from 2010 – 2012 mobile speed test:

Speed Test Download Tier	Count	% of Tests
2	3	3%
3	4	4%
4	18	18%
5	45	45%
6	25	25%
7	5	5%

Speed Test Upload Tier	Count	% of Tests
1	1	1%
2	11	11%
3	74	74%
4	13	13%
5	1	1%

Mobile speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 9/526 (1.7%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 0/526 (0%)
Number of tracts reported to FCC, but no census blocks reported to project: 0

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 5/526 (<1%)
Total number of dead zones reported per provider via broadband.maryland.gov: 7

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: 11/526 (2%) of census blocks were confirmed using online search feature of given provider

Mediacom WebSearch Verification Table	Count	Percentage
Total # of sample points	1496	
Number of sample points with results	85	6%
Result is yes and coverage area is in served area	11	13%
Result is yes but not in a coverage area reported as served	17	20%
Result is no and coverage area is in served area	3	4%
Result is no and coverage area is not in served area	54	64%

Change in coverage area from Fall 2012 Submission to Spring 2013 Submission: 25 census block decrease

MegaPath Corporation

DBA: MegaPath Corp

Data Characteristics

Date of Original Submission:	2/1/2010
Date of Update Submission:	2/15/2013
Currency of Data:	12/31/2012
FRN:	0003753787
Type of data submitted:	Census Block Table, Road Segments, Middle Mile
Census Block Count:	73622
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	3
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	Yes
Provided Road Segments for census blocks greater than 2 sq miles:	Yes

***See ReadMe.txt**

Data Processing

Census Block Process:

- Join the census block table to the 2010 census blocks based on the GEOID10 field
  - Export results for each technology of transmission
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Road Segment Process:

- Join road segments to 2010 TigerLine by TLID
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_RoadSegment

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
3	403	0%
4	15550	10%
5	84064	54%
6	24324	16%
7	26508	17%
8	5590	4%

Max Upload Category	Count	% of Blocks
2	17174	11%
3	29693	19%
4	8656	6%
5	72803	47%
7	22523	14%
8	5590	4%

Road Segments

Max Download Category	Count	% of Roads
4	235	12%
5	1668	82%
6	122	6%
7	8	0%

Max Upload Category	Count	% of Roads
2	109	5%
3	122	6%
4	193	9%
5	1601	79%
7	8	0%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
3	7770	5%
4	30505	19%
5	84997	54%
6	7348	5%
7	21139	14%
8	4680	3%

Typical Upload Category	Count	% of Blocks
2	41410	26%
3	5930	4%
4	19244	12%
5	61742	39%
6	4960	3%
7	18473	12%
8	4680	3%

Road Segments

Typical Download Category	Count	% of Roads
3	42	2%
4	284	14%
5	1699	84%
7	8	0%

Typical Upload Category	Count	% of Roads
2	231	11%
4	217	11%
5	1577	78%
7	8	0%

Typical down/upload speed from 2010 – 2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
1	1	1%
2	13	13%
3	52	50%
4	23	22%
5	5	5%
6	6	6%

Speed Test Upload Tier	Count	% of Tests
1	26	25%
2	40	39%
3	23	22%
4	10	10%
5	4	4%

7	2	2%
10	1	1%

Computer based speed tests match reported typical speeds or are within 1 speed tier: No

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 0/73622 (0%)

Typical down/upload speed from 2010 – 2012 mobile based speed test:

Speed Test Download Tier	Count	% of Tests
1	1	1%
2	21	19%
3	33	29%
4	43	38%
5	10	9%
6	3	3%
7	1	1%

Speed Test Upload Tier	Count	% of Tests
1	8	7%
2	78	70%
3	21	19%
4	2	2%
5	2	2%
7	1	1%

Mobile based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 1/73622 (< 1%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC:
14072/73622 (19%)
Number of tracts reported to FCC, but no census blocks reported to project: 1

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov:
62/73622 (< 1%)
Total number of dead zones reported per provider via broadband.maryland.gov: 77

Number of census blocks with dead zones reported via mdbroadbandmap.org:
18/73622 (< 1%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 19

Web Search Verification: N/A

Change in coverage area from Fall 2012 Submission to Spring 2013 Submission: no change

Mountain Communications, LLC

DBA: ProCom

Data Characteristics

Date of Original Submission:	5/31/2010
Date of Update Submission:	N/A
Currency of Data:	6/30/2010
FRN:	0008039323
Type of data submitted:	Census Blocks, Road Segments
Census Block Count:	161
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	Yes

***See ReadMe.txt**

Data Processing

Census Block Process:

- Join the census block table to the 2010 census blocks based on the GEOID10 field
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Road Segment Process:

- Road segments are 2009 geometry
- Join road segments to TigerLine by TLID
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_RoadSegment

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
10	161	100%

Max Upload Category	Count	% of Blocks
10	161	100%

Road Segments

Max Download Category	Count	% of Blocks
10	95	100%

Max Upload Category	Count	% of Blocks
10	161	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 – 2012 computer based speed test: N/A

Computer based speed tests match reported typical download speeds or are within 1 speed tier: N/A

Computer based tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): N/A

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 73/161 (45%)
Number of tracts reported to FCC, but no census blocks reported to project: 1

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 1/161 (<1%)
Total number of dead zones reported per provider via broadband.maryland.gov: 1

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0/161 (0%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Change in coverage area from Fall 2012 Submission to Spring 2013 Submission: no change

Neon Connect, Inc

DBA: Sidera Networks

Data Characteristics

Date of Original Submission:	3/5/2010
Date of Update Submission:	1/14/2013
Currency of Data:	12/31/2012
FRN:	0006254403
Type of data submitted:	Addresses, Middle Mile
Census Block Count:	1
Total Matched Address Points Count:	1
Unmatched Address Points:	0
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	Yes
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
  - Number matched: 1
  - Number unmatched: 0
- Spatially join address points to 2010 census blocks

Census Block Process:

- Join the address points to the 2010 census blocks based on the GEOID10 field
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
10	1	100%

Max Upload Category	Count	% of Blocks
10	1	100%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
10	1	100%

Typical Upload Category	Count	% of Blocks
10	1	100%

Typical down/upload speed from 2010 – 2012 computer based speed test: N/A

Computer based speed tests match reported typical download speeds or are within 1 speed tier: N/A

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): N/A

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: N/A
Number of tracts reported to FCC, but no census blocks reported to project: N/A

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0/1 (0%)
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0/1 (0%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Change in coverage area from Fall 2012 Submission to Spring 2013 Submission: no change

New Edge Holding Company

DBA Name: New Edge Network, Inc

Data Characteristics

Date of Original Submission:	1/22/2010
Date of Update Submission:	N/A
Currency of Data:	6/30/2011
FRN:	0003720471
Type of data submitted:	Address Table
Census Block Count:	273
Total Matched Address Points Count:	371
Unmatched Address Points:	0
Number of Technology of Transmission Types:	3
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Address Table Process:

- Geocode address table to ESRI address locator
  - Number matched: 335
  - Number unmatched: 2
- Unmatched address are geocoded to MDPV address locator
  - Number matched: 1
  - Number unmatched: 1
- Unmatched address are geocoded to Maryland street centerline address locator
  - Number matched: 1
  - Number unmatched: 1
- Merge matched addresses
- Spatially join address points to 2010 census blocks
- Separate and export the address points according to technology of transmission Select by location the address points that are completely within a greater than two square mile census block
  - Export as address points to be loaded into the NTIA data model
    - Result: BB_Service_Address
  - Switch the selection and export as points to create census blocks

Census Block Process:

- Join the switched selection (BB_Service_Address) address points to the 2010 census blocks based on the GEOID10 field
    - Export results (for each technology of transmission)
    - Load exported results into the NTIA data model
        - Result: BB_Service_CensusBlock

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
3	58	20%
4	216	73%
5	20	7%
7	1	0%

Max Upload Category	Count	% of Blocks
2	167	57%
3	80	27%
4	47	16%
7	1	0%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
3	58	20%
4	216	73%
5	20	7%
7	1	0%

Typical Upload Category	Count	% of Blocks
2	167	56%
3	80	28%
4	47	16%
7	1	0%

Typical down/upload speed from 2010 – 2012 computer based speed test: N/A

Computer based speed tests match reported typical download speeds or are within 1 speed tier: N/A

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): N/A

Typical down/upload speed from 2010 – 2012 mobile based speed test:

Speed Test Download Tier	Count	% of Tests
3	3	33%
4	7	78%

Speed Test Upload Tier	Count	% of Tests
2	4	44%
3	2	22%
4	4	44%

Mobile speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 4/273 (1.5%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: N/A
Number of tracts reported to FCC, but no census blocks reported to project: N/A

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0/273 (0%)
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0/273 (0%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Change in coverage area from Fall 2012 Submission to Spring 2013 Submission: no change

NTELOS

DBA Name: NTELOS

Data Characteristics

Date of Original Submission:	2/3/2012
Date of Update Submission:	3/4/2013
Currency of Data:	12/31/2012
FRN:	0005849518
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Remove coverage areas less than 0.125 square miles
- Remove coverage area "holes" less than 0.125 square miles
- Load coverage area into the NTIA data model
    - Result: BB_Service_Wireless

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
3	1	100%

Max Upload Category	Count	% of Area
2	1	100%

Typical down/upload speeds reported by provider:

Coverage Area

Typical Download Category	Count	% of Area
3	1	100%

Typical Upload Category	Count	% of Area
2	1	100%

Typical down/upload speed from 2010-2012 mobile based speed test: N/A

Mobile based speed tests match reported typical download speeds or are within 1 speed tier: N/A

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: N/A
Number of mobile speed tests reported outside coverage area: N/A

Form 477 Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: N/A
#/% of tracts reported as served to FCC but do not intersect coverage area: N/A

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov: 2/303 (<1%)
Number of dead zones reported within coverage area via mdbroadbandmap.org: 0/101 (0%)

Web Search Verification: N/A

Wireless Verification: N/A

One Communications

DBA: One Communications

Data Characteristics

Date of Original Submission:	3/8/2011
Date of Update Submission:	N/A
Currency of Data:	6/30/2011
FRN:	0015337702
Type of data submitted:	Address Table
Census Block Count:	148
Total Matched Address Points Count:	161
Unmatched Address Points:	8
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
  - Number matched: 156
  - Number unmatched: 13
- Unmatched addresses are geocoded to Maryland Property View address locator
  - Number matched: 4
  - Number unmatched: 9
- Unmatched addresses are geocoded to Maryland centerline address locator
  - Number matched: 1
  - Number unmatched: 8
- Spatially join address points to 2010 census blocks

Census Block Process:

- Join the switched address points to the 2010 census blocks based on the GEOID10 field
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Verification

Maximum down/upload speeds reported by provider: N/A

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 – 2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
2	1	14%
3	2	29%
4	1	14%
5	1	14%
7	1	14%
8	1	14%

Speed Test Upload Tier	Count	% of Tests
3	3	43%
4	1	14%
5	1	14%
6	2	29%

Computer based speed tests match reported typical download speeds or are within 1 speed tier: N/A

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 7/148 (4.7%)

Typical down/upload speed from 2010 – 2012 mobile speed test:

Speed Test Download Tier	Count	% of Tests
1	1	14%
2	1	14%
3	2	29%
4	1	14%
5	2	29%

Speed Test Upload Tier	Count	% of Tests
1	1	14%
3	2	29%
4	3	43%
5	1	14%

Mobile speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 1/148 (<1%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 9/148 (6%)
Number of tracts reported to FCC, but no census blocks reported to project: 30

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0/148 (0%)
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0/148 (0%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Change in coverage area from Fall 2012 Submission to Spring 2013 Submission: no change

PAETEC Communications, Inc.

DBA Name: PAETEC Communications, Inc.

Data Characteristics

Date of Original Submission:	2/28/2011
Date of Update Submission:	N/A
Currency of Data:	12/31/2010
FRN:	0011017795
Type of data submitted:	Address Table
Census Block Count:	301
Total Matched Address Points Count:	373
Unmatched Address Points:	4
Number of Technology of Transmission Types:	2
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

***See ReadMe.txt**

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
  - Number matched: 359
  - Number unmatched: 18
- Unmatched address are geocoded to Maryland Property View address locator
  - Number matched: 9
  - Number unmatched: 9
- Unmatched address are geocoded to Maryland centerline address locator
  - Number matched: 5
  - Number unmatched: 4
- Merge matched addresses
- Spatially join address points to 2010 census blocks
- Separate and export the address points according to technology of transmission

Census Block Process:

- Join the address points to the 2010 census blocks based on the GEOID10 field
  - Export results
  - Load exported results into the NTIA data model

- Result: BB_Service_CensusBlock

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
11	315	100%

Max Upload Category	Count	% of Blocks
11	315	100%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
3	92	29%
4	223	71%

Typical Upload Category	Count	% of Blocks
3	92	29%
4	223	71%

Typical down/upload speed from 2010 – 2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
1	62	56%
2	3	3%
3	23	21%
4	14	13%
5	5	5%
8	3	3%

Speed Test Upload Tier	Count	% of Tests
1	57	52%
2	11	10%
3	23	21%
4	11	10%
5	7	6%
7	1	1%

Computer based speed tests match reported typical download speeds or are within 1 speed tier: No

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 22/301 (7.3%)

Typical down/upload speed from 2010 – 2012 mobile speed test:

Speed Test Download Tier	Count	% of Tests
1	15	15%
2	21	21%
3	31	32%
4	15	15%
5	8	8%
6	1	1%
7	7	7%

Speed Test Upload Tier	Count	% of Tests
1	9	9%
2	17	17%
3	19	19%
4	10	10%
5	10	10%
6	5	5%
7	28	29%

Mobile speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 41/301 (13.6%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 4/301 (1%)
Number of tracts reported to FCC, but no census blocks reported to project: 597

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0/301 (0%)
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0/301 (0%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Change in coverage area from Fall 2012 Submission to Spring 2013 Submission: no change

QCOL, Inc.

DBA Name: QCOL

Data Characteristics

Date of Original Submission:	5/31/2010
Date of Update Submission:	3//2013
Currency of Data:	12/31/2012
FRN:	0019663095
Type of data submitted:	Census Block Table, Road Segments
Census Block Count:	308
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	2
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	Yes

***See ReadMe.txt**

Data Processing

Census Block Process:

- Join the census block table to the 2010 census blocks based on the GEOID10 field
  - Export results for each technology of transmission
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Road Segment Process:

- Join road segments to 2009 TigerLine by TLID
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_RoadSegment

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
10	205	55%
6	167	45%

Max Upload Category	Count	% of Blocks
10	205	55%
6	167	45%

Road Segments

Max Download Category	Count	% of Segments
10	27	56%
6	21	44%

Max Upload Category	Count	% of Segments
10	27	56%
6	21	44%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 – 2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
4	2	50%
5	1	25%
6	1	25%

Speed Test Upload Tier	Count	% of Tests
2	1	25%
3	2	50%
5	1	25%

Computer based speed tests match reported typical download speeds or are within 1 speed tier: N/A

Typical down/upload speed from 2010 – 2012 mobile based speed test:

Speed Test Download Tier	Count	% of Tests
2	2	29%
3	2	29%
4	1	14%
5	1	14%
6	1	14%

Speed Test Upload Tier	Count	% of Tests
2	3	43%
3	2	29%
4	2	29%

Mobile speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 5/308 (2%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 11/308 (3.6%)
Number of tracts reported to FCC, but no census blocks reported to project: 0

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 3/308 (1%)
Total number of dead zones reported per provider via broadband.maryland.gov: 3

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0/308 (0%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Change in coverage area from Fall 2012 Submission to Spring 2013 Submission: no change

Shenandoah Personal Communications, LLC

DBA Name: Shentel (Sprint Affiliate)

Data Characteristics

Date of Original Submission:	3/7/2013
Date of Update Submission:	N/A
Currency of Data:	12/31/2012
FRN:	0021503834
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	Yes
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Remove coverage areas less than 0.125 square miles
- Remove coverage area "holes" less than 0.125 square miles
- Load coverage area into the NTIA data model
    - Result: BB_Service_Wireless

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Blocks
5	1	100%

Max Upload Category	Count	% of Blocks
4	1	100%

Typical down/upload speeds reported by provider:

Coverage Area

Typical Download Category	Count	% of Blocks
5	1	100%

Typical Upload Category	Count	% of Blocks
4	1	100%

Typical down/upload speed from 2010-2012 mobile speed test:

Speed Test Download Tier	Count	% of Tests

Speed Test Upload Tier	Count	% of Tests

1	38	6%
2	81	12%
3	161	25%
4	204	31%
5	118	18%
6	39	6%
7	7	1%
8	1	0%

1	85	13%
2	215	33%
3	327	50%
4	19	3%
7	3	0%

Mobile based speed tests match reported typical download speeds or are within 1 speed tier: Yes

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: 7/7 (100%)
Number of mobile speed tests reported outside coverage area: 0/7 (0.0%)

Typical down/upload speed from 2010-2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
2	11	8%
3	16	12%
4	29	22%
5	49	37%
6	24	18%
7	3	2%

Speed Test Upload Tier	Count	% of Tests
1	7	5%
2	32	24%
3	93	70%

#/% of computer based speed tests verifying coverage area:
Number of computer based speed tests reported inside coverage area: 50/51 (98.0%)
Number of computer based speed tests reported outside coverage area: 1/51 (1.9%)

Form 477 Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: N/A
#/% of tracts reported as served to FCC but do not intersect coverage area: N/A

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov: 17/303 (5.6%)
Number of dead zones reported within coverage area via mdbroadbandmap.org: 2/101 (1.98%)

Web Search Verification: N/A

Wireless Verification: N/A

Shenandoah Cable Television, LLC

DBA: Shentel

Data Characteristics

Date of Original Submission:	5/31/2010
Date of Update Submission:	3/7/2013
Currency of Data:	12/31/2012
FRN:	0021657853
Type of data submitted:	CAI, Census Blocks, Middle Mile, Road Segments
Census Block Count:	617
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	Yes
Provided Road Segments for census blocks greater than 2 sq miles:	Yes

Data Processing

Census Block Process:

- Join the census block table to the 2010 census blocks based on the GEOID10 field
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Road Segment Process:

- Join the road segment table to the 2010 Tiger Lines based on TLID field
  - Load exported results into the NTIA data model
    - Result: BB_Service_RoadSegment

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
9	617	100%

Max Upload Category	Count	% of Blocks
7	617	100%

Road Segments

Max Download Category	Count	% of Blocks
9	68	100%

Max Upload Category	Count	% of Blocks
7	68	100%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
9	617	100%

Typical Upload Category	Count	% of Blocks
7	617	100%

Road Segments

Typical Download Category	Count	% of Blocks
9	68	100%

Typical Upload Category	Count	% of Blocks
7	68	100%

Typical down/upload speed from 2010 – 2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
2	1	2%
3	3	6%
4	5	10%
5	13	25%
7	3	6%
8	6	12%
9	9	18%
10	11	22%

Speed Test Upload Tier	Count	% of Tests
1	2	4%
2	9	18%
3	18	35%
4	22	43%

Computer based speed tests match reported typical download speeds or are within 1 speed tier: No

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 6/617 (<1%)

Typical down/upload speed from 2010 – 2012 mobile speed test:

Speed Test Download Tier	Count	% of Tests
3	2	29%
4	1	14%
5	4	57%

Speed Test Upload Tier	Count	% of Tests
3	7	100%

Mobile speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 1/617 (<1%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: N/A
Number of tracts reported to FCC, but no census blocks reported to project: N/A

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0/617 (0%)
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0/617 (0%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Change in coverage area from Fall 2012 Submission to Spring 2013 Submission: 6 census block increase

Skycasters

DBA Name: Skycasters

Data Characteristics

Date of Original Submission:	9/13/2012
Date of Update Submission:	1/4/2013
Currency of Data:	12/31/2012
FRN:	0018756155
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Remove coverage areas less than 0.125 square miles
- Remove coverage area "holes" less than 0.125 square miles
- Load coverage area into the NTIA data model
    - Result: BB_Service_Wireless

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
6	1	100%

Max Upload Category	Count	% of Area
4	1	100%

Typical down/upload speeds reported by provider:

Coverage Area

Typical Download Category	Count	% of Area
5	1	100%

Typical Upload Category	Count	% of Area
2	1	100%

Typical down/upload speed from 2010-2012 mobile speed test: N/A

Mobile based speed tests match reported typical download speeds or are within 1 speed tier: N/A

Form 477Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: N/A
#/% of tracts reported as served to FCC but do not intersect coverage area: N/A

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov: 303/303 (100%)
Number of dead zones reported within coverage area via mdbroadbandmap.org: 101/101 (100%)

Web Search Verification: N/A

Sprint Nextel Corporation

DBA Name: Sprint Nextel Corporation

Data Characteristics

Date of Original Submission:	2/18/2010
Date of Update Submission:	1/24/2013
Currency of Data:	12/31/2012
FRN:	0003774593
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	Yes
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Remove coverage areas less than 0.125 square miles
- Remove coverage area "holes" less than 0.125 square miles
- Load coverage area into the NTIA data model
    - Result: BB_Service_Wireless

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
3	1	33%
5	1	33%
6	1	33%

Max Upload Category	Count	% of Area
2	1	33%
3	1	33%
4	1	33%

Typical down/upload speeds reported by provider:

Coverage Area

Typical Download Category	Count	% of Area

Typical Upload Category	Count	% of Area

3	1	33%
5	1	33%
6	1	33%

2	1	33%
3	1	33%
4	1	33%

Typical down/upload speed from 2010-2012 mobile speed test:

Speed Test Download Tier	Count	% of Tests
1	2476	17%
2	4038	28%
3	2673	19%
4	2855	20%
5	1694	12%
6	374	3%
7	129	1%
8	4	0%

Speed Test Upload Tier	Count	% of Tests
1	3456	24%
2	6480	45%
3	3623	25%
4	358	3%
5	163	1%
6	64	0%
7	57	0%
8	42	0%

Mobile based speed tests match reported typical download speeds or are within 1 speed tier: Yes

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: 14033/14243 (98.5%)
Number of mobile speed tests reported outside coverage area: 210/14243 (1.5%)

Typical down/upload speed from 2010-2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
1	91	14%
2	277	41%
3	240	36%
4	21	3%
5	14	2%
6	7	1%
7	10	1%
8	6	1%
9	4	1%

Speed Test Upload Tier	Count	% of Tests
1	223	33%
2	398	59%
3	22	3%
4	6	1%
5	8	1%
6	9	1%
7	2	0%
8	2	0%

#/% of computer based speed tests verifying coverage area:
Number of computer based speed tests reported inside coverage area: 651/670 (97.2%)
Number of computer based speed tests reported outside coverage area: 19/670 (2.8%)

Form 477Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: 1364/1376 (99%)
#/% of tracts reported as served to FCC but do not intersect coverage area: 12/1376 (1%)

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov:
235/303 (77.5%)
Number of dead zones reported within coverage area via mdbroadbandmap.org:
65/101 (34.6%)

Web Search Verification: N/A

Wireless Verification: N/A

StarBand Communications Inc.

DBA Name: StarBand Communications Inc.

Data Characteristics

Date of Original Submission:	1/26/2010
Date of Update Submission:	2/19/2013
Currency of Data:	12/31/2012
FRN:	0005087457
Type of data submitted:	Coverage
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

***See ReadMe.txt**

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Remove coverage areas less than 0.125 square miles
- Remove coverage area "holes" less than 0.125 square miles
- Load coverage area into the NTIA data model
    - Result: BB_Service_Wireless

Data Modifications: Speed Domains:

- Provider delivered Typical Upstream Speed less than speed tier 2
    - Calculated Typical Upstream speed to 2

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
3	1	100%

Max Upload Category	Count	% of Area
2	1	100%

Typical down/upload speeds reported by provider:

Coverage Area

Typical Download Category	Count	% of Area
3	1	100%

Typical Upload Category	Count	% of Area
2	1	100%

Typical down/upload speed from 2010-2012 mobile speed test: N/A

Mobile based speed tests match reported typical download speeds or are within 1 speed tier: N/A

# of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: N/A
Number of mobile speed tests reported outside coverage area: N/A

Form 477 Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: N/A
#/% of tracts reported as served to FCC but do not intersect coverage area: N/A

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov: 303/303 (100%)
Number of dead zones reported within coverage area via mdbroadbandmap.org: 101/101 (100%)

Web Search Verification: N/A

Wireless Verification: N/A

Starpower Communications, LLC

DBA Name: RCN & RCN Business Solutions

Data Characteristics

Date of Original Submission:	3/5/2010
Date of Update Submission:	2/25/2013
Currency of Data:	12/31/2012
FRN:	0003735016
Type of data submitted:	Address Table, Middle Mile
Census Block Count:	1815
Total Matched Address Points Count:	372972
Unmatched Address Points:	50
Number of Technology of Transmission Types:	3
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Partial
Provided Max Typical Upload Speed:	Partial
Provided Middle Mile:	Yes
Provided Road Segments for census blocks greater than 2 sq miles:	No

***See ReadMe.txt**

Data Processing

Address Table Process:

- Geocode address table to Maryland Property View address locator
  - Number matched: 35303
  - Number unmatched: 2719
- Unmatched address are geocoded to ESRI US Streets address locator
  - Number matched: 2669
  - Number unmatched: 50
- Merge matched addresses
- Spatially join address points to 2010 census blocks

Census Block Process:

- Join the address points to the 2010 census blocks based on the GEOID10 field
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
7	1273	41%
9	1815	59%

Max Upload Category	Count	% of Blocks
4	1273	41%
6	1815	59%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
no data	1428	46%
4	6	0%
5	5	0%
6	2	0%
7	1260	41%
9	387	13%

Typical Upload Category	Count	% of Blocks
no data	1428	46%
2	6	0%
3	154	5%
4	1177	38%
5	16	1%
6	268	9%
7	39	1%

Typical down/upload speed from 2010 – 2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
1	12	6%
2	1	1%
4	12	6%
5	38	19%
6	52	27%
7	77	39%
8	1	1%
9	1	1%
10	1	1%

Speed Test Upload Tier	Count	% of Tests
1	3	2%
2	105	54%
3	9	5%
4	68	35%
5	10	5%

Computer based speed tests match reported typical download speeds or are within 1 speed tier: Yes

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 10/1815 (<1%)

Typical down/upload speed from 2010 – 2012 mobile speed test:

Speed Test Download Tier	Count	% of Tests
1	2	1%
2	15	5%
3	16	6%

Speed Test Upload Tier	Count	% of Tests
1	6	2%
2	71	25%
3	26	9%

4	20	7%
5	34	12%
6	80	28%
7	102	36%
8	15	5%

4	131	46%
5	15	5%
6	29	10%
7	6	2%

Mobile speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 34/1815 (2%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: N/A
Number of tracts reported to FCC, but no census blocks reported to project: N/A

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 2/1815 (<1%)
Total number of dead zones reported per provider via broadband.maryland.gov: 2

Number of census blocks with dead zones reported via mdbroadbandmap.org: 1/1815 (<1%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 1

Web Search Verification: 4/1815 (< 1%) of census blocks were confirmed using online search feature of given provider

Starpower WebSearch Verification Table	Count	Percentage
Total # of sample points	1496	
Number of sample points with results	286	19%
Result is yes and census block is in served area	4	1%
Result is yes but not in a census block reported as served	3	1%
Result is no and census block is in served area	4	1%
Result is no and census block not served area	275	96%

Change in coverage area from Fall 2012 Submission to Spring 2013 Submission: 4,893 census block decrease

Tata Communications (America) Inc.

DBA Name: Tata Communications (America) Inc.

Data Characteristics

Date of Original Submission:	2/1/2010
Date of Update Submission:	2/11/2013
Currency of Data:	12/31/2012
FRN:	0009480302
Type of data submitted:	Address Table
Census Block Count:	1
Total Matched Address Points Count:	1
Unmatched Address Points:	0
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
  - Number matched: 1
  - Number unmatched: 0
- Spatially join address points to 2010 census blocks

Census Block Process:

- Join the address points to the 2010 census blocks based on the GEOID10 field
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
4	1	100%

Max Upload Category	Count	% of Blocks
4	1	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 – 2012 computer based speed test

Speed Test Download Tier	Count	% of Tests
2	1	100%

Speed Test Upload Tier	Count	% of Tests
2	1	100%

Computer based speed tests match reported typical downloaded speeds or are within 1 speed tier: N/A

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 1/1 (100%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 1/1 (100%)
Number of tracts reported to FCC, but no census blocks reported to project: 0

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0/1 (0%)
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0/1 (0%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Change in coverage area from Fall 2012 Submission to Spring 2013 Submission: no change

T-Mobile USA, Inc.

DBA Name: T-Mobile USA, Inc.

Data Characteristics

Date of Original Submission:	2/25/2010
Date of Update Submission:	2/13/2013
Currency of Data:	12/31/2012
FRN:	0006945950
Type of data submitted:	Coverage Area, Middle Mile
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	Yes
Provided Road Segments for census blocks greater than 2 sq miles:	No

***See ReadMe.txt**

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Remove coverage areas less than 0.125 square miles
- Remove coverage area "holes" less than 0.125 square miles
- Load coverage area into the NTIA data model
    - Result: BB_Service_Wireless

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
4	1	33%
6	1	33%
7	1	33%

Max Upload Category	Count	% of Area
2	1	33%
4	2	67%

Typical down/upload speeds reported by provider:

Coverage Area

Typical Download Category	Count	% of Area
3	1	33%
5	1	33%
6	1	33%

Typical Upload Category	Count	% of Area
2	1	33%
3	1	33%
3	1	33%

Typical down/upload speed from 2010 mobile speed test:

Speed Test Download Tier	Count	% of Tests
1	1710	14%
2	2131	17%
3	2072	17%
4	2897	24%
5	2697	22%
6	652	5%
7	140	1%
8	2	0%

Speed Test Upload Tier	Count	% of Tests
1	1815	15%
2	4501	37%
3	3734	30%
4	1950	16%
5	228	2%
6	22	0%
7	40	0%
8	11	0%

Mobile based speed tests match reported typical download speeds or are within 1 speed tier: Yes

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: 12053/12301 (97.9%)
Number of mobile speed tests reported outside coverage area: 248/12301 (2.0%)

Form477 Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: N/A
#/% of tracts reported as served to FCC but do not intersect coverage area: N/A

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov: 134/303 (44.2%)
Number of dead zones reported within coverage area via mdbroadbandmap.org: 33/101 (32.6%)

Web Search Verification: N/A

Wireless Verification: N/A

twtelecom of maryland, llc

DBA Name: twtelecom of maryland, llc

Data Characteristics

Date of Original Submission:	1/30/2010
Date of Update Submission:	3/1/2013
Currency of Data:	12/31/2012
FRN:	0017348202
Type of data submitted:	Address table
Census Block Count:	122
Total Matched Address Points Count:	143
Unmatched Address Points:	0
Number of Technology of Transmission Types:	2
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	Yes
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Address Table Process:

- Geocode address table to Maryland Property View address locator
  - Number matched: 144
  - Number unmatched: 38
- Geocode unmatched addresses to ESRI US Streets address locator
  - Number matched: 36
  - Number unmatched: 2
- Geocode unmatched addresses to Maryland center line address locator
  - Number matched: 2
  - Number unmatched: 0
- Spatially join address points to 2010 census blocks
- Separate and export the address points according to technology of transmission

Census Block Process:

- Join the address points to the 2010 census blocks based on the GEOID10 field
  - Export results for each technology of transmission
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
3	10	8%
4	28	22%
5	17	13%
6	5	4%
7	38	29%
8	7	5%
9	7	5%
10	14	11%
11	3	2%

Max Upload Category	Count	% of Blocks
3	10	8%
4	28	22%
5	17	13%
6	5	4%
7	38	29%
8	7	5%
9	7	5%
10	14	11%
11	3	2%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 – 2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
1	6	35%
3	2	12%
4	3	18%
5	3	18%
7	3	18%

Speed Test Upload Tier	Count	% of Tests
1	5	29%
2	2	12%
3	1	6%
4	3	18%
5	5	29%
7	1	6%

Computer based speed tests match reported typical download speeds or are within 1 speed tier: N/A

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 11/122 (9%)

Typical down/upload speed from 2010 – 2012 mobile speed test:

Speed Test Download Tier	Count	% of Tests
1	9	39%
2	2	9%
3	1	4%
4	3	13%
5	3	13%
6	2	9%

Speed Test Upload Tier	Count	% of Tests
1	6	26%
2	5	22%
3	2	9%
4	1	4%
5	5	22%
6	4	17%

7	3	13%

Mobile speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 9/122 (7%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 27/122 (22%)
Number of tracts reported to FCC, but no census blocks reported to project: 8

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0/122 (0%)
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0/122 (0%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Change in coverage area from Fall 2012 Submission to Spring 2013 Submission: 25 census block increase

United States Cellular Corporation

DBA Name: US Cellular

Data Characteristics

Date of Original Submission:	2/2/2012
Date of Update Submission:	1/28/2013
Currency of Data:	12/31/2012
FRN:	0004372322
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Remove coverage areas less than 0.125 square miles
- Remove coverage area "holes" less than 0.125 square miles
- Load coverage area into the NTIA data model
    - Result: BB_Service_Wireless

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
4	1	50%
6	1	50%

Max Upload Category	Count	% of Area
3	1	50%
5	1	50%

Typical down/upload speeds reported by provider:

Coverage Area

Typical Download Category	Count	% of Area
4	1	50%
6	1	50%

Typical Upload Category	Count	% of Area
3	1	50%
5	1	50%

Typical down/upload speed from 2010-2012 mobile speed test: N/A

Mobile based speed tests match reported typical download speeds or are within 1 speed tier: N/A

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: N/A
Number of mobile speed tests reported outside coverage area: N/A

Form 477 Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: N/A
#/% of tracts reported as served to FCC but do not intersect coverage area: N/A

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov: 30/303 (9.9%)
Number of dead zones reported within coverage area via mdbroadbandmap.org: 4/101 (3.9%)

Web Search Verification: N/A

Wireless Verification: N/A

Vector Data Systems LLC

DBA Name: Vector Data Systems LLC

Data Characteristics

Date of Original Submission:	3/31/2010
Date of Update Submission:	3/7/2013
Currency of Data:	12/31/2012
FRN:	0017306663
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Remove coverage areas less than 0.125 square miles
- Remove coverage area "holes" less than 0.125 square miles
- Load coverage area into the NTIA data model
    - Result: BB_Service_Wireless

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
7	1	100%

Max Upload Category	Count	% of Area
7	1	100%

Typical down/upload speeds reported by provider:

Coverage Area

Typical Download Category	Count	% of Area
5	1	100%

Typical Upload Category	Count	% of Area
4	1	100%

Typical down/upload speed from 2010-2012 mobile speed test: N/A

Mobile based speed tests match reported typical download speeds or are within 1 speed tier: N/A

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: N/A
Number of mobile speed tests reported outside coverage area: N/A

Form 477Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: 7/7 (100%)
#/% of tracts reported as served to FCC but do not intersect coverage area: 0/7 (0.0%)

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov: 5/303 (1.6%)
Number of dead zones reported within coverage area via mdbroadbandmap.org: 0/101 (0.0%)

Web Search Verification: N/A

Wireless Verification: N/A

Verizon Communications Inc

DBA: Verizon Maryland Inc

Data Characteristics

Date of Original Submission:	2/15/2010
Date of Update Submission:	2/27/2013
Currency of Data:	12/31/2012
FRN:	0002166825
Type of data submitted:	Census Block Table, Road Segments, Middle Mile
Census Block Count:	76756
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	2
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	Yes
Provided Road Segments for census blocks greater than 2 sq miles:	Yes

Data Processing

Census Block Process:

- Join the census block table to 2010 census blocks based on the GEOID10 field
  - Export results for each technology of transmission
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Road Segment Process:

- Join road segments to 2010 TigerLine by TLID
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_RoadSegment

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
4	11601	12%
5	36698	39%

Max Upload Category	Count	% of Blocks
2	11601	12%
3	49117	52%

6	12419	13%
9	33183	35%

7	33183	35%

Road Segments

Max Download Category	Count	% of Blocks
4	1219	30%
5	1562	39%
6	117	3%
9	1107	28%

Max Upload Category	Count	% of Blocks
2	1219	30%
3	1679	42%
7	1107	28%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 – 2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
1	49	1%
2	606	7%
3	805	10%
4	1316	16%
5	511	6%
6	808	10%
7	3046	36%
8	1165	14%
9	102	1%
10	34	0%

Speed Test Upload Tier	Count	% of Tests
1	634	8%
2	2312	27%
3	78	1%
4	967	11%
5	1775	21%
6	722	9%
7	1702	20%
8	244	3%
9	8	0%

Speed tests match reported typical download speeds or are within 1 speed tier: N/A

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 36/76756 (<1%)

Typical down/upload speed from 2010 – 2012 mobile speed test:

Speed Test Download Tier	Count	% of Tests
1	593	3%
2	1125	5%
3	1372	6%
4	2372	11%
5	2618	12%
6	3218	15%
7	8844	41%
8	1192	6%
9	2	0%

Speed Test Upload Tier	Count	% of Tests
1	991	5%
2	3038	14%
3	1039	5%
4	2525	12%
5	4890	23%
6	2646	12%
7	5577	26%
8	624	3%
9	6	0%

10	1	0%	10	1	0%

Mobile speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 435/76756 (<1%)

Form 477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 6643/76756 (8.7%)
Number of tracts reported to FCC, but no census blocks reported to project: 0

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 129/76756 (<1%)
Total number of dead zones reported per provider via broadband.maryland.gov: 201

Number of census blocks with dead zones reported via mdbroadbandmap.org: 40/76756 (<1%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 47

Web Search Verification: 485/76756 (<1%) of census blocks were confirmed using online search feature of given provider

VerizonMD WebSearch Verification Table	Count	Percentage
Total # of sample points	1496	
Number of sample points with results	1428	95%
Result is yes and census block is in served area	485	34%
Result is yes but not in a census block reported as served	57	4%
Result is no and census block is in served area	415	29%
Result is no and census block not served area	467	33%

Change in coverage area from Fall 2012 Submission to Spring 2013 Submission: 4 census block increase

ViaSat, Inc.

DBA Name: ViaSat Communications, Inc.

Data Characteristics

Date of Original Submission:	4/21/2010
Date of Update Submission:	2/19/2013
Currency of Data:	12/31/2012
FRN:	0007843766
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

***See ReadMe.txt**

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Remove coverage areas less than 0.125 square miles
- Remove coverage area "holes" less than 0.125 square miles
- Load coverage area into the NTIA data model
    - Result: BB_Service_Wireless

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area					
Max Download Category	Count	% of Area	Max Upload Category	Count	% of Area
4	1	50%	2	1	50%
5	1	50%	4	1	50%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010-2012 mobile speed test:

Speed Test Download Tier	Count	% of Tests
0	5	50%
3	4	40%
7	1	10%

Speed Test Upload Tier	Count	% of Tests
1	9	90%
5	1	10%

Mobile based speed tests match reported typical download speeds or are within 1 speed tier: N/A

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: 12/12 (100%)
Number of mobile speed tests reported outside coverage area: 0/12 (0.0%)

Typical down/upload speed from 2010-2012 computer speed test:

Speed Test Download Tier	Count	% of Tests
1	1	8%
2	4	33%
3	4	33%
6	1	8%
7	2	17%

Speed Test Upload Tier	Count	% of Tests
1	9	75%
5	3	25%

#/% of computer based speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: 117/117 (100%)
Number of mobile speed tests reported outside coverage area: 0/117 (0.0%)

Form 477Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: 221/221 (100%)
#/% of tracts reported as served to FCC but do not intersect coverage area: 0/221 (0%)

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov: 303/303 (100%)
Number of dead zones reported within coverage area via mdbroadbandmap.org: 101/101 (100%)

Web Search Verification: N/A

Wireless Verification: N/A

XO Holdings, Inc

DBA Name: XO Communications, LLC

Data Characteristics

Date of Original Submission:	2/1/2010
Date of Update Submission:	3/8/2013
Currency of Data:	12/31/2012
FRN:	0006275945
Type of data submitted:	Census Blocks
Census Block Count:	322
Total Matched Address Points Count:	354
Unmatched Address Points:	0
Number of Technology of Transmission Types:	3
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

***See ReadMe.txt**

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
  - Number matched: 354
  - Number unmatched: 0
- Spatially join address points to 2010 census blocks
- Separate and export the address points according to technology of transmission

Census Block Process:

- Join the address points to the 2010 census blocks based on the GEOID10 field
  - Export results for each technology of transmission
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks

Max Upload Category	Count	% of Blocks

3	30	9%
4	193	60%
5	48	15%
6	13	4%
7	29	9%
8	7	2%
10	3	1%

2	7	2%
3	28	9%
4	188	58%
5	48	15%
6	13	4%
7	29	9%
8	7	2%
10	3	1%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 – 2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
1	6	7%
2	19	22%
3	27	32%
4	13	15%
5	7	8%
6	6	7%
7	2	2%
8	5	6%

Speed Test Upload Tier	Count	% of Tests
1	2	2%
2	30	35%
3	26	31%
4	7	8%
5	8	9%
6	5	6%
7	6	7%
8	1	1%

Computer based speed tests match reported typical download speeds or are within 1 speed tier: N/A

Computer base speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 45/322 (14%)

Typical down/upload speed from 2010 – 2012 mobile speed test:

Speed Test Download Tier	Count	% of Tests
1	8	13%
2	26	41%
3	16	25%
4	5	8%
5	6	10%
6	2	3%

Speed Test Upload Tier	Count	% of Tests
1	11	17%
2	18	29%
3	22	35%
4	6	10%
5	3	5%
6	3	5%

Mobile speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 34/322 (10.6%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 54/322 (16.8%)
Number of tracts reported to FCC, but no census blocks reported to project: 127

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 3/322 (<1%)
Total number of dead zones reported per provider via broadband.maryland.gov: 3

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0/322 (<0%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Change in coverage area from Fall 2012 Submission to Spring 2013 Submission: no change

Zayo Bandwidth LLC

DBA Name: Zayo Bandwidth LLC

Data Characteristics

Date of Original Submission:	1/13/2011
Date of Update Submission:	3/6/2013
Currency of Data:	12/31/2012
FRN:	0019133826
Type of data submitted:	Census Tracts
Census Block Count:	226
Total Matched Address Points Count:	0
Unmatched Address Points:	0
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Census Block Process:

- Select by location all census blocks within tract, removing water blocks
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
8	60	27%
9	166	73%

Max Upload Category	Count	% of Blocks
8	60	27%
9	166	73%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
8	60	27%
9	166	73%

Typical Upload Category	Count	% of Blocks
8	60	27%
9	166	73%

Typical down/upload speed from 2010 – 2012 computer based speed test: N/A

Computer based speed tests match reported typical download speeds or are within 1 speed tier: N/A

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): N/A

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 0/226 (0%)
Number of tracts reported to FCC, but no census blocks reported to project: 1

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0/226 (0%)
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0/226 (0%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Change in coverage area from Fall 2012 Submission to Spring 2013 Submission: 166 census block increase

Maine SBI Data Submittal to NTIA

Technical Whitepaper

7th Data Delivery

April 1, 2013

Table of Contents

List of Figures

1 Introduction

As an NTIA State Broadband Data Development (SBDD) or State Broadband Initiative (SBI) grant recipient, the State of Maine is undertaking a statewide project to inventory and map broadband services for inclusion in both national and state broadband maps. The SBI grantee project team for Maine consists of the ConnectME Authority (ConnectME), the Maine Office of GIS (MeGIS), and the James W. Sewall Company (Sewall). The team is collecting broadband service availability data, including speeds and types of technology, as well as information on Community Anchor Institution (CAI) locations across the entire state. The collected service data undergoes geospatial processing and verification steps before it is loaded into Maine's broadband geodatabase. This geodatabase is used to satisfy NTIA's bi-annual submission requirements as well as support the ConnectME Authority's statewide initiatives and programs.

This whitepaper describes the deliverable datasets, the data collection process and the verification process.

2 Data Description

The Maine team is providing spatial data representing provider coverage in the state as well as information on validation and verification processes. Files provided are as follows:

Filename	Description
ME_SBDD_2013_04_01.gdb	Folder containing SBDD transfer file geodatabase
ME_DataPackage_2013_04_01.xlsx	Data Package file
ME_2013_04_01.txt	Data Submission Receipt file
ME_Methodology_2013_04_01.pdf	Methodology Paper file
ME_ReadMe_2013_04_01.txt	ReadMe file
ME_2013_04_01_Changes_and_Corrections.pdf	Document listing changes and corrections since 1-October-2012 submission to NTIA

3 Provider Participation

Company Response	*Number*	*% of Total Companies*
Provided data	36	67.92%
Will provide data	1	1.89%
Will not provide data	8	15.09%
Non-responsive	8	15.09%
Total	**53**	**100.00%**

The Maine team identified 53 individual providers. Companies that provide multiple technologies of service or have multiple subsidiaries are counted only once. This is one less than the 1-October-2012 submission as Covad Communications Group, Inc. merged with Megapath, Inc.

Information on the providers is included on the 'ProviderTable' spreadsheet in the file **ME_DataPackage_2013_04_01.xlsx** included as part of the submission to NTIA.

4 Data Collection and Integration

4.1 Provider Outreach and Data Gathering

Mapping broadband footprints across the State begins by identifying potential providers and contacting them to determine service capabilities and level of participation. If a provider offers broadband level Internet service in Maine, the provider will be invited to participate in the project. After executing a non-disclosure agreement (NDA), the provider submits data showing where services are offered, technology of transmission used, and maximum advertised downstream and upstream speeds. The project team has developed a step by step process that has been captured by the high-level workflow shown in ***Figure 1***. Starting with contacting a service provider, the workflow allows a user to determine whether a provider should be included and if so what types of service are offered.

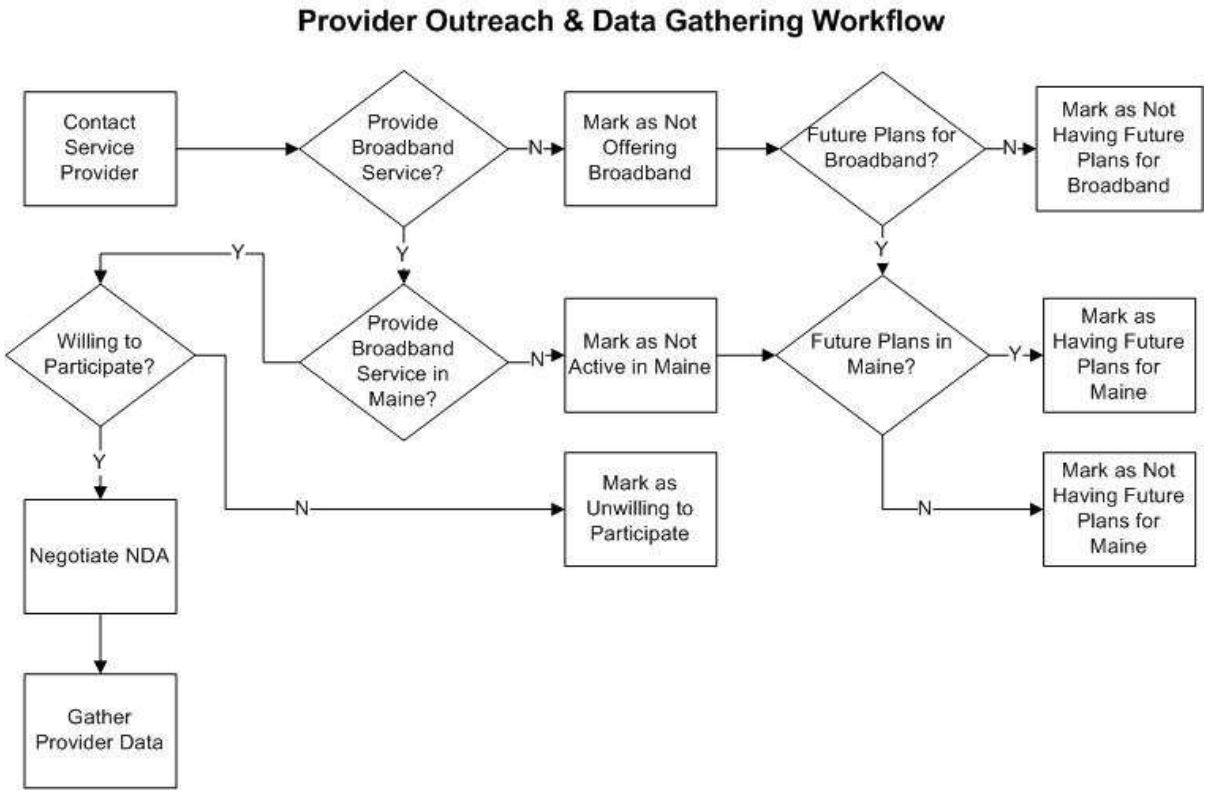


Figure 1 - Provider Outreach and Data Gathering Workflow

The task of reaching out to the provider community and gathering service data has five main tasks: Research Service Providers, Execute NDA, Gather Provider Data, Assess Provider Data, and Categorize Data for Production.

4.1.1 Research Service Providers

The Maine project team has established a service provider contact database, which contains contact information for all of the potential broadband service providers in the state. The initial set of providers was obtained from state and industry lists as well as Internet research. Ongoing management of the list is required because new providers begin offering services that qualify as broadband and changes occur to existing provider companies through mergers or acquisitions.

Sewall initially contacts each provider by phone and introduces the project. One purpose for the initial contact is to identify the individual at the provider company with whom the team should be working. In some instances, especially for larger companies it may take multiple attempts before the appropriate person is reached.

Another purpose is to determine if the company's services meet the requirements for inclusion in the project. If a company offers broadband level service in Maine then the next step is to determine the type(s) of service being offered, whether the service offerings are as an end-user provider or as a middle mile/back haul provider, and whether the company owns facilities or re-sells services using another carrier's network. Data from back haul carriers and resellers are included in the project.

A third purpose behind the initial contact is to confirm that the provider wants to participate in project and is willing to submit data that represents its service offerings and coverages. Provider companies who elect to participate are invited to execute an NDA to protect those data items considered to be confidential or proprietary. If a provider company does not want to participate, Sewall may look for assistance from the ConnectME Authority and the NTIA SBI project team to encourage participation.

4.1.2 Execute Non-Disclosure Agreement (NDA)

The process of executing an NDA starts with sending a letter of introduction along with an NDA template and a copy of a ConnectME Protective Order. **Appendix A** contains a sample letter. The NDA template was drafted by the Maine law firm, Rudman & Winchell, based on confidentiality guidelines presented by NTIA and can be found in **Appendix B**. A copy of the ConnectME Protective Order signed on 21 December 2009 at the request of many of the service providers is in **Appendix C**.

Changes to the NDA template are negotiated with individual companies as needed. Once finalized, the NDA is signed by the provider company, Sewall, and the ConnectME Authority before the data gathering process begins.

4.1.3 Gather Provider Data

More often than not after an NDA has been executed, a different individual at a provider company is identified as the primary contact for data submittals. Once the contact is confirmed, a data submittal information sheet prepared by the project team is sent to the contact. The data submittal sheet identifies the data items desired and has definitions from the SBDD NOFA. The items requested include:

- FRN or provider FCC Registration Number
- Location and extents of service coverage
- Technology of service
- Speeds of service including maximum advertised downstream & upstream speeds and typical downstream & upstream speeds
- Tower and transmitter locations and transmission attributes (for fixed wireless service)
- Middle mile and back haul connection points
- Customer service locations (for wired and fixed wireless service)
- Failed service locations (for wired and fixed wireless service)
- Service to Community Anchor Institutions

After sending the data submittal information Sewall follows up with the provider contact to review the requested data items and discuss potential formats for submitting data. The team is cognizant of the wide range of environments operated by the provider companies and recognizes the need to accommodate submissions in many different formats including tabular (CSV, Excel, DBF), GIS (ESRI shapefile, ESRI geodatabase, MapInfo, Google KML/KMZ, CAD (AutoCAD, Microstation), and hardcopy. The team also understands that many of the smaller providers in Maine are handicapped by a lack of resources in trying to comply with the project's data submission requirements. Some of the issues facing these providers include small staff sizes, lack of mapping technical expertise, and proprietary digital systems. Sewall lends technical assistance and expertise as needed.

Sewall has deployed a web-based GeoPortal site to accommodate all digital data transfers related to the broadband mapping project. Additional details pertaining to this site can be found in **Section 5.6.1**.

4.1.4 Assess Provider Data

After data has been submitted by a provider, Sewall catalogues it and assesses the data files to see if all of the requested items were provided and what data types were received. Sewall also verifies the locations and spatial definitions for the data items and checks for missing attribute information. Any questions generated are sent to the provider for clarification. It is common for the initial submission to need multiple iterations of data exchanges and feedback before the submission is completed.

Once an initial set of broadband service data is in place, follow-up rounds of data gathering will incorporate modifications to existing service coverages, service types, or service speeds. Later submittals by a provider could consist of an entire set of data records or may only contain updates since the previous submission. Sewall's integration processes are equipped with GIS and database tools to fold newer versions of provider records into the existing baseline. The team anticipates that further development and refinement of these processes and tools will be made as more update submissions are received.

4.1.5 Categorize Data for Production

When data from a provider has been received and assessed, production processes are needed to integrate the data into the project database. **Section 4** of this paper describes the various workflows to turn the submitted data into the SBDD data transfer model features and attributes.

4.2 Community Anchor Outreach and Data Gathering

Community Anchor Institutions (CAI), as defined by NTIA NOFA category codes, consist of the following:

Category 1: School – K through 12
Category 2: Library
Category 3: Medical/Healthcare
Category 4: Public Safety
Category 5: University, College, Other post secondary
Category 6: Other community support – government
Category 7: Other community support – non-governmental

The three primary steps with the CAI are data gathering, data processing and attribution.

4.2.1 Data Gathering

Several data sources were utilized to represent all CAI categories across the state.

State of Maine, Office of Geographic Information Systems (MEGIS)

ARMORIES
CEMA (County Emergency Management Agency)
COLLEGES
FIRE
HOSPITAL
HAS (Hospital Service Areas)
MEAIR (Airports)
POLICE
REDCROSS
RESCUE
SCHLIB (Schools & Libraries)

NAVTEQ-NAVSTREETS (Points of Interest)

NAVTEQ-COMMSVC
NAVTEQ-EDUINSTS
NAVTEQ-HOSPITAL

NAVTEQ-TRANSHUBS

State of Maine, Office of Information Technology – State Facilities

State Facilities File

Maine Department of Health & Human Services (DHHS) – Maine Care Services

Hospitals
Clinics/Rehab/Nursing
Schools
Pharmacies
Home Care
Counseling/Psychologists
Shared Living
Mental Health
School Departments
Health related businesses

Maine School and Library Network (MSLN)

K-12 schools
Public libraries

Maine's Research & Education Network (MaineREN)

Universities and colleges

United States Postal Service (USPS)

Post Office Locations

Service Provider Data

CAI data submitted by provider companies

4.2.2 Data Processing

The data processing task involved an in-depth cleaning and sorting of all CAI source records. Data is initially sorted as spatial (e.g., GIS layer) and non-spatial (e.g., table) data. The spatial data consisted of points and generally needed minimal formatting before loading into a personal geodatabase. The non-spatial data required some initial format revisions to prepare the data for geocoding to generate spatial geometry. The following descriptions associated with ***Figure 2*** below outline the overall workflow and processes involved.

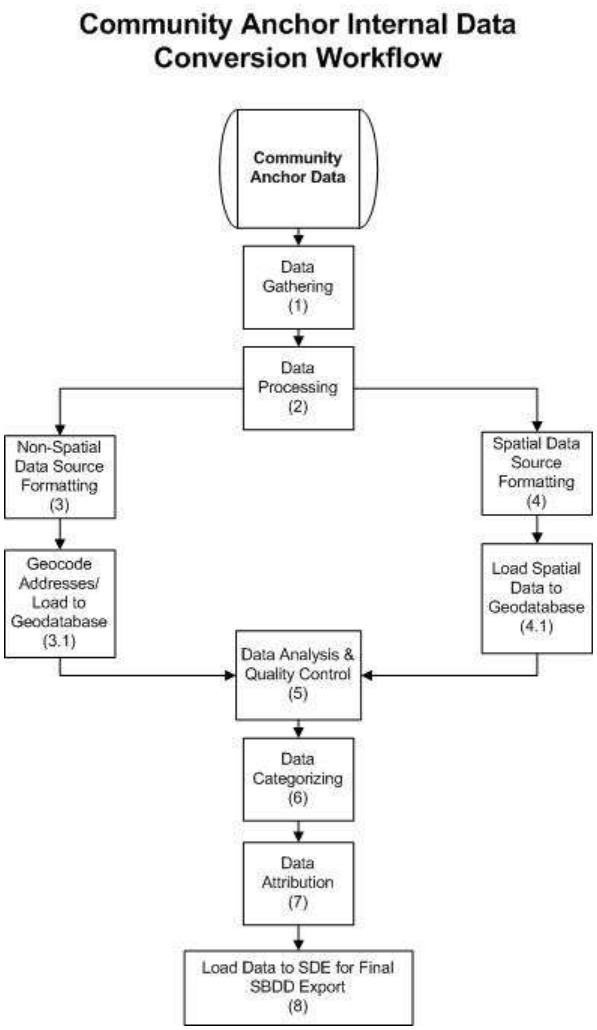


Figure 2 - Community Anchor Internal Workflow

(1) Data Gathering

Data gathering involves acquiring source data involving the seven categories defined by NTIA NOFA. Data may originate from several sources including state, county, town, outreach programs, service providers and more. Records are documented for metadata and given a level of confidence reflecting the data source, spatial accuracy and processing enhancements.

(2) Data Processing

The data processing phase separates the data sources into two types: flat file (non-spatial) and spatial. A flat file refers to data or a table that contains 1 record per line, generally in the format of an .xls spreadsheet or .dbf table. Without spatial coordinate values to translate to points, this type of data must be geocoded in ArcGIS. Spatial data contains pre-defined coordinate values or is already in a format containing spatial geometry with a defined projection and can be imported directly.

(3) Non-Spatial Data Source Formatting
Non-spatial data files are scrubbed to ensure that all necessary fields are present and are formatted to run through the geocoding process.

(3.1) Geocode Addresses/Load to Geodatabase
Using the geocoding tool in ArcGIS, an address locator file must first be setup. The address locator file maps out the ConnectME street centerline fields and is used as a reference for the non-spatial data during the geocoding process. The non-spatial data is saved as a .csv file. Shown below is a typical record formatted to geocode.

Name	Address1	City	State	Zip
Healthworks	10 Bangor St	Bangor	ME	04401

In this example, the geocoding process will reference or match this address record to the ConnectME street address locator and place a point at this location in the map layer. All records in the source file are processed at once. Points are generated, based on how matching parameters or set. Points are then loaded into personal geodatabase for final scrubbing and quality acceptance.

Name	Address1	City	State	Latitude	Longitude
Healthworks	10 Bangor St	Bangor	ME	46.1252	-67.8422

(4) Spatial Data Source Formatting
Spatial data sources are received as flat files with spatial coordinate values or reside in a GIS layer as points. Each source type is processed differently.

Flat files with coordinate values:

- Prepare field name formats
- Prepare coordinate values in decimal degrees
- Add X,Y data into ArcGIS, generating the point locations on the fly
- Output to personal geodatabase for final scrubbing and quality acceptance

Point files:

- Export file to shapefile format if necessary
- Project file to state coordinate system (UTM NAD83 Zone19 Meters) for compatibility with other data layers
- Output to personal geodatabase for final scrubbing and quality acceptance

(4.1) Load Spatial Data to Geodatabase
All spatial data types (point files) are loaded into a personal geodatabase for final scrubbing and quality acceptance.

(5) Data Analysis and Quality Control
A final analysis is completed on all points loaded in the personal geodatabase to identify any issues. The table below indicates the primary types of issues, the means to detect them, and the resulting solution.

Issue ⇒	***Identification ⇒***	***Result***
Duplicate Points	Selection by location/imagery review	Delete incorrect record
Unmatched geocoded records	Google Maps review	Matched record
Inaccurate CAI locations	Imagery review	Modify point location
Unsuitable CAI	-	Delete record

(6) Data Categorizing
Once the CAI records have gone through the data analysis and quality control, the records are given a category value of 1 to 7, as discussed in the introduction.

(7) Data Attribution
CAI attributes are the most difficult to acquire at the data gathering stage and are typically acquired through additional steps, including contacting each CAI. The required attributes are:

- Broadband Service
- Technology of Transmission
- Advertised Downstream and Upstream Speeds

The project team has completed the initial round of contacting each CAI to collect the above information. The task was completed by assembling a call center group assigned to contacting each CAI to establish a primary contact and address verification followed by exercising an on-line survey aimed to provide feedback to the items listed above. Completed surveys were compiled through the use of SurveyMonkey.com and final survey output (.csv) was prepped and values were loaded into the CAI database to populate attributes.

Additional sources and surveys have been utilized to populate the database including MSLN (Maine School and Library Network), NCES (National Center for Education Statistics), the Maine Fiber Company as part of its Three-Ring Binder project, and state agency listings provided by the chief technical officer.

The project team has also begun a crowd sourcing initiative with the Maine Municipal Association (MMA) to collect CAI information from its membership.

The project team will continue to compile CAI data utilizing all the above resources and research additional data sources and methodologies to populate these attributes.

(8) Load Data to SDE for Final SBDD Export
CAI data is loaded from the personal geodatabase to the SDE environment for final export to SBDD format.

4.3 Data Analysis and Conversion

Data is analyzed and converted with different processes, depending on its type and characteristics.

4.3.1 Fixed Wired Transmission

Fixed wired service provider companies in the state of Maine range from small to large businesses and utilize several distinct types of technology to deploy broadband service. In order to accommodate the varied inputs, Sewall has developed a flexible and comprehensive workflow to incorporate provider information into a state broadband map developed by Sewall in conjunction with the ConnectME Authority.

The ConnectME model depicts broadband service provider coverage at the street segment level. The model uses a street centerline as the spatial component of the coverage, and a related table stores provider specific information for street segments. Sewall developed production tools to accommodate the incorporation of service provider data into this ConnectME model and instill quality control into the process.

The steps in the process for analyzing and converting Fixed Wired Transmission data are outlined in ***Figure 3*** and described below.

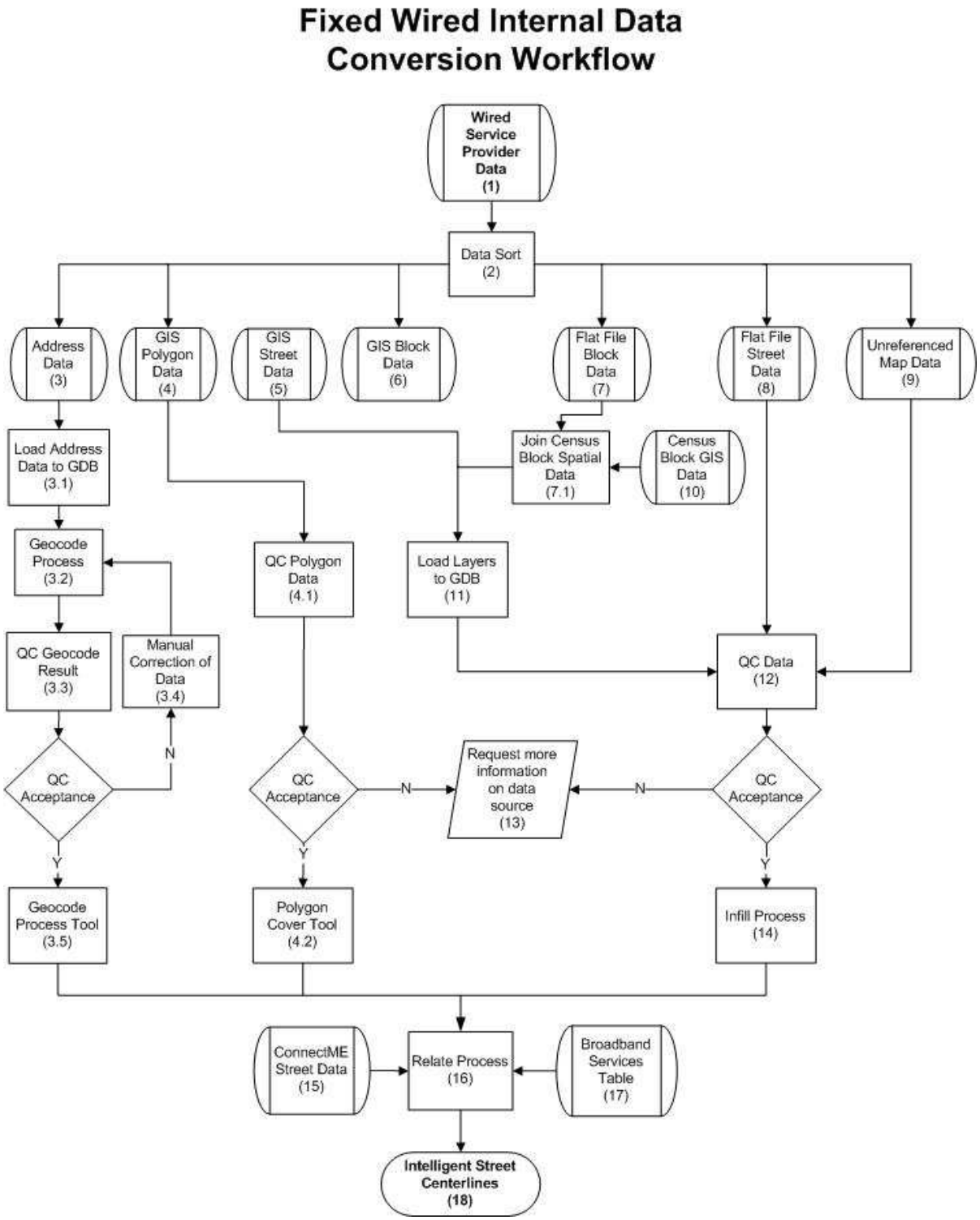


Figure 3 - Data Flow for Fixed Wired Transmission Providers

(1) Wired Service Provider Data

The data bin is the storage location for wired broadband service provider data gathered by Sewall.

(2) Data Sort
The data sort phase immediately follows the data collection process. Analysts sort the wired data by provider and by data characteristics. The wired data can consist of address data, predefined coverage data, flat file coverage data and unreferenced maps. Individual workflows have been developed by Sewall for the various data formats.

(3) Address Data
The address data bin is reserved for service provider data that is at the address level. Examples of address data formats received are spreadsheet and text file format.

(3.1) Load Address Data to Geodatabase
Address data is formatted to meet the ArcGIS geocoder standards and loaded into the geodatabase for processing. The formatting of the address data will include ensuring fields with the full street address and town name are populated in the dataset.

(3.2) Geocode Process
Formatted address data is geocoded using the ConnectME street centerline dataset. The address locator style used in this process is the ArcGIS US Streets with Zone. For this process, the city fields of the ConnectME street dataset are utilized in the zone component of the locator.

(3.3) QC Geocode Result
Analysts review the address data geocode result for the following:

- Overall geocode hit rate
- Town geocode hit rates
- Data anomalies

If address data fails any of these checks the data will not pass QC acceptance.

(3.4) Manual Correction of Data
Address data that has not passed the QC acceptance is evaluated for corrections necessary for the data to pass QC acceptance. Corrections to town names and updates to street names are commonly required to match the naming conventions in the ConnectME roads dataset.

(3.5) Geocode Process Tool
Sewall has developed an ArcGIS tool named Geocode Process Tool that translates the accepted geocoded address data into tabular address range records related to the accompanying ConnectME street centerlines. This tool is shown in ***Figure 4*** below.

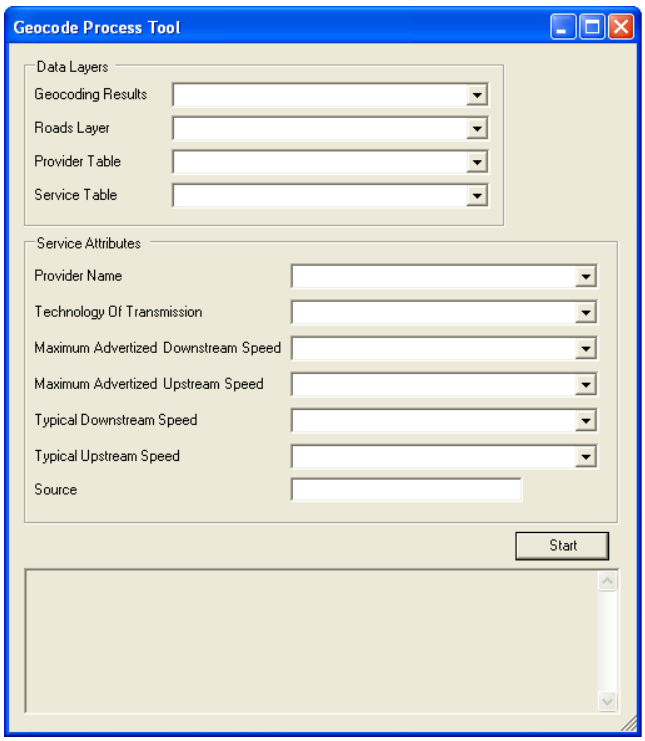


Figure 4 - Geocode Process Tool
Data Layers:(1) Geocoding Results - geocoded layer of address data (2) Roads Layer - ConnectME roads data layer (3) Provider Table - table of provider specific information (4) Service Table - broadband service output table where the service provider street address ranges are stored.
Service Attributes: The first six values are necessary to populate fields in the deliverable. Source is used to designate that the records created are from the Geocode Process Tool.

In ArcMap the user specifies which layers in the map correspond with the data layer inputs for the tool as well as the service provider service attributes that correspond with the geocode address point layer. Once the information is set the user clicks 'Start' and the process begins.

Each geocoded address point within the geocode layer has as an attribute the street segment that the address was geocoded to. Using this street link, the tool can locate all of the geocoded address points assigned to a given street segment and build a modified street range of broadband service for the street segment. The tool then creates a record in the Broadband Service table that contains a link to the street segment in the ConnectME street feature class and populates the record with the derived broadband service street segment range and specified service provider information. This process is repeated for each unique street segment listed in the geocoded address point layer.

(4) GIS Polygon Data
The GIS polygon data bin is for service provider data that represents a coverage area of broadband availability and is delivered in a GIS format.

(4.1) QC Polygon Data

Datasets from the GIS polygon data bin are reviewed by an analyst. The QC routine ensures that the data has spatial integrity and includes the necessary attribution for inclusion to the state broadband project.

(4.2) Polygon Cover Tool

Sewall has developed an ArcGIS tool named Polygon Cover that converts service provider coverage area polygons into street segment related tabular records. Each tabular record created by the tool incorporates the service provider broadband specification information as well as modified street ranges representing provider street coverage.

This tool was initially created by Sewall for use on the fixed wireless viewshed datasets but was incorporated into the wired workflow for service providers that provided polygon regions of service coverage.

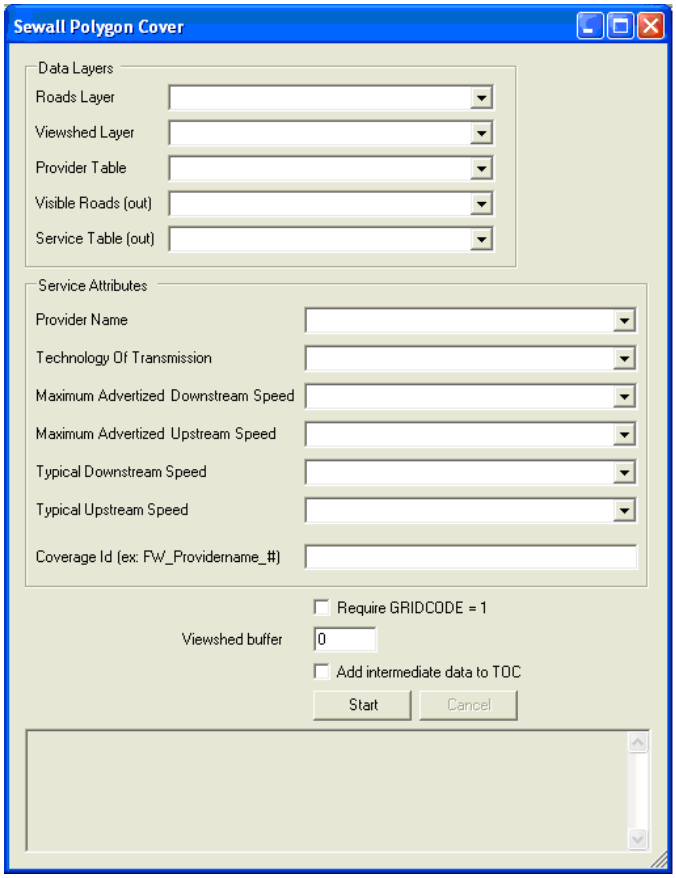


Figure 5 - Polygon Cover Tool
Data Layers: (1) Roads Layer - ConnectME street centerline data layer with address ranges (2) Viewshed Layer - viewshed layer used in delineating visible polygons for clipping road segments. For wired providers this would be the polygon layer that depicts a provider's coverage area. (3) Provider Table - internal processing flag (4) Visible Roads (out) - output feature class that stores the clipped road segment geometry (5) Service Table (out) - output table that the extracted address ranges populate.
Service Attributes: The first seven values are necessary to populate fields in the deliverable.
Require GRIDCODE = 1: Toggle is unchecked when running a wired broadband provider dataset that is represented as a coverage area.

In ArcMap the user specifies which layers in the map correspond with the data layer inputs for the tool as well as setting the service attributes for the service provider polygon layer. While running the Polygon Cover tool for fixed wired service regions analysts ensure the Require GRIDCODE = 1 toggle is unchecked. Since this tool was initially created for use with a viewshed polygon output, the tool will not run on a non-viewshed layer unless this toggle is unchecked. Once the information is set the user clicks 'Start' and the process begins.

The tool selects street segments from the input Roads layer that intersect the input polygon coverage and exports the street segments to a separate working file. These streets are then clipped to the polygon coverage. Next the tool runs a length ratio process that assigns each street segment a fractional value based on the clipped and original lengths. The tool then populates modified street range attributes based on the length ratio of a segment and the original street range of a segment. These modified street range values represent the broadband service street range of the provider. For each street segment the tool also creates a record in the Broadband Service table that contains a link to the original street segment in the ConnectME street feature class and populates the record with the modified broadband service street segment range and specified service provider information.

(5) GIS Street Data
The GIS street data bin is for wired broadband provider data at the street segment level that is delivered in a GIS format.

(6) GIS Block Data
The GIS block data bin is for provider data that is delivered at the census block level in a GIS format.

(7) Flat File Block Data
Census block service data delivered in a flat file format is stored in the flat file block data bin. Examples of flat file data are spreadsheets, text files and database files.

(7.1) Join Census Block Spatial Data
Flat file block provider coverage information is joined to a spatial census block layer using the full census block id value. Blocks with provider information joined are exported creating a spatial representation of the provider's census block broadband coverage.

(8) Flat File Street Data
The flat file street data bin is where provider data is stored when Sewall receives street level information in a format that cannot be associated spatially. Examples of files types delivered in a flat file format are spreadsheet, database and text file.

(9) Unreferenced Map Data
Provider data that cannot be referenced in ArcGIS are stored in the unreferenced map data bin. Examples of this type include paper maps and PDF documents.

(10) Census Block GIS Data
This data is Census 2010 block data in GIS format for the state of Maine that has been downloaded from the US Census website.

(11) Load Layers to GDB
Provider GIS data is loaded into the Sewall SDE geodatabase. A feature class is created for each provider's dataset. Sewall workflow tracking attributes are added to the feature classes.

(12) QC Data
Datasets are sent to a Sewall analyst for QC. The QC routine is to ensure that the data includes the necessary information for inclusion to the state broadband project. Provider data is cross-referenced with information on broadband availability that has been gathered from other sources. The QC of datasets with spatial data includes additional QC routines to ensure spatial integrity.

(13) Request more information on data source
Broadband provider data that does not meet the QC acceptance criteria Sewall initiates a request order to the provider for additional information. This request includes a detailed listing of the deficiencies found in the data as well as inquiries regarding spatial inaccuracies and anomalies discovered in the analysis.

(14) Infill Process
Sewall developed a tool named Infill to interact with the ConnectME street segments and populate related tabular records for fixed wired service provider availability. The Infill Tool allows a user to configure a specific set of service provider parameters, select ConnectME street segments, and then view and edit the related broadband availability information in the Broadband Services table that corresponds with the configured attributes. This tool is used to input fixed wired broadband availability data that Sewall received as census block, street or unreferenced map data. The majority of fixed wired service provider datasets utilize the Infill Tool for processing. A screenshot of the configuration dialog box is shown as Figure 6 below.

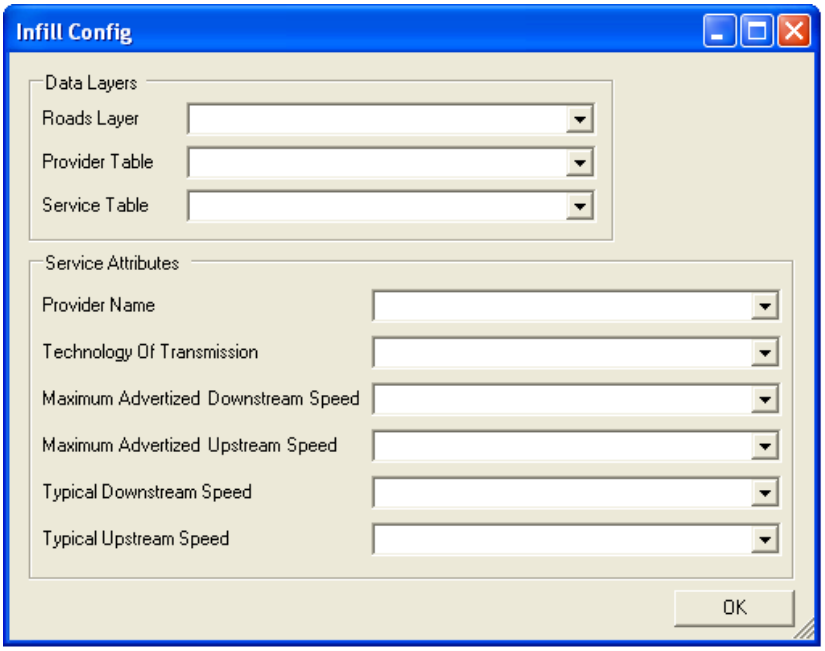


Figure 6 - Infill Tool Configuration
Data Layers: (1) Roads Layer: ConnectME roads data layer (2) Provider Table: Internal processing flag (3) Service Table: Broadband Service output table where the service provider street address ranges are stored. Service Attributes: These fields are necessary to populate fields in the deliverable.

The first time a user uses the Infill tool in an ArcMap session, the 'Infill Config' screen appears. The user enters the input data layers and the attributes for the service provider dataset that the tool will utilize during processing.

Once the Infill Config screen has been set a user selects one or more ConnectME road segments. Using the unique primary key values of the selected streets and the specified provider name and technology of transmission the tool searches the Broadband Services table for existing matching tabular records. If matches are found from this search, the tool reports the information in the Infill window. For selected street segments where no match was found in the Broadband Services table, the tool populates the Infill window with street segment road name and street range attributes representing potential broadband service ranges for the provider on the selected streets. These street range attributes can be updated in the Infill window based on provider sources. This Infill tool window is shown as ***Figure 7***.

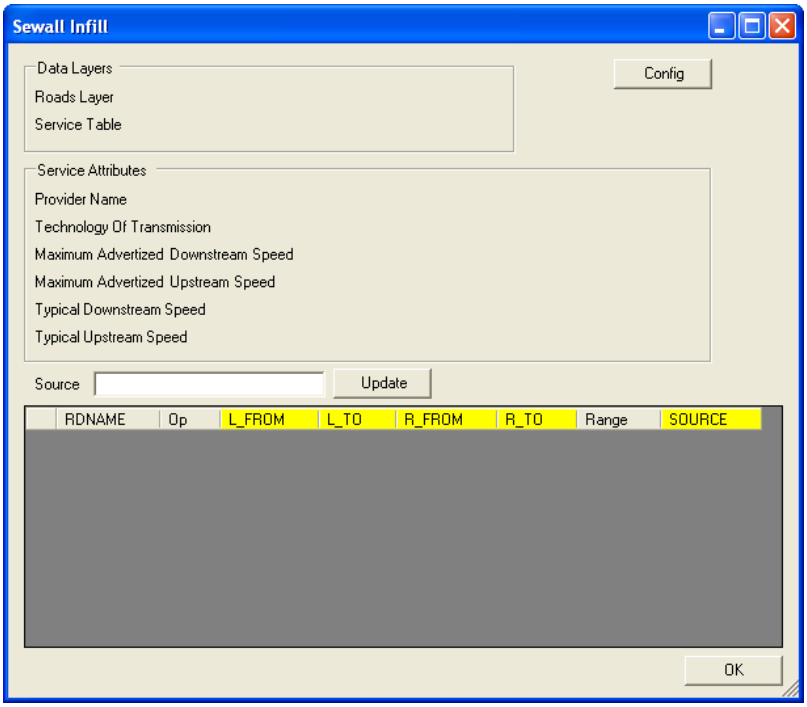


Figure 7 - Infill Tool
Data Layers: (1) Roads Layer: ConnectME roads data layer (2) Service Table: Broadband Service output table where the service provider street address ranges are stored
*Config: Opens the Infill Config window (**Figure 6**)*
Service Attributes: These fields are necessary to populate fields in the deliverable.
Source: Internal flag for source of service availability
Update: Updates selected tabular records SOURCE field to the value entered in the Source field
Tabular Record Attributes: (1) RDNAME: Name of ConnectME road segment (2) Op: Operation being performed {INSERT-new tabular record, UPDATE-update existing tabular record, DELETE-delete tabular record} (3) L_FROM: "Left from" broadband address range of ConnectME road segment (4) L_TO: "Left to" broadband address value of ConnectME road segment (5) R_FROM: "Right from" broadband address value of ConnectME road segment (6) R_TO: "Right to" broadband address value of ConnectME road segment (7) Range: Reports either "full" or "partial" and is a comparison for each tabular record of the broadband provider street range to the accompanying ConnectME street range (8) SOURCE: Internal process flag.

Once the user has reviewed the values, pressing 'OK' will perform the operations listed in the Op field.

(15) ConnectME Street Data
The ConnectME street data bin contains the street centerline dataset used in the geocode and street relate processes. The Maine Office of GIS E-911 street centerline file was used to create the base street segments and gives the project the most accurate street centerline file for the State of Maine. The NAVTEQ street centerline dataset NAVSTREETS was utilized to infill street segments in areas where gaps were assessed in the MEGIS E-911 file.

(16) Relate Process
Through the use of Sewall developed tools the data gathered for fixed wired broadband service providers gets stored in the Broadband Services table as availability street ranges associated with street centerline segments. Each record in the Broadband Services table is

associated by a foreign key/primary key relationship with a street segment in the ConnectME street centerline dataset. This relationship allows for clean and easy access to street level availability of service providers.

(17) Broadband Services Table
The Broadband Services geodatabase table was developed by Sewall to store broadband service provider information and street range coverage. NTIA requirements and formats were utilized when creating the fields to ensure the records stored in the Broadband Service table are compatible with the SBDD data model.

(18) Intelligent Street Centerlines
The output from the fixed wired workflow is a comprehensive intelligent street centerline network comprised of street centerlines and related service availability tabular records.

4.3.2 Fixed Wireless Transmission

The initial stage of mapping terrestrial fixed wireless service territories depends on the quality of the data received. To process any service footprint of a particular transmitter, the initial resources acquired during the data collection phase of the project are critical.

Terrestrial Fixed Wireless technology is clouded by many variables that determine the overall performance of each transmitter signal. Inaccurate data pertaining to location, height of a transmitter, horizontal and vertical limitations, signal range and many more factors present potential obstacles to producing an accurate representation of any transmitter's service footprint. Some of these factors have not been considered during the mapping process due to lack of data needed for modeling them. For example, while a 10-meter DEM is used to represent the surface terrain, we have not incorporated obstructions on the surface such as trees and other man-made obstacles that could influence a transmitter's propagation model.

The data collection process and subsequent conversion workflow is designed to accommodate a variety of data sources received from the service providers and production tools have been developed to build efficiencies and quality control into the workflow. When received by the service providers, supplemental data is used throughout the conversion workflow to help verify the mapping results. However, a larger scale verification process is described in **Section 5**.

The data conversion process for fixed wireless transmission is represented by ***Figure 8*** and described below.

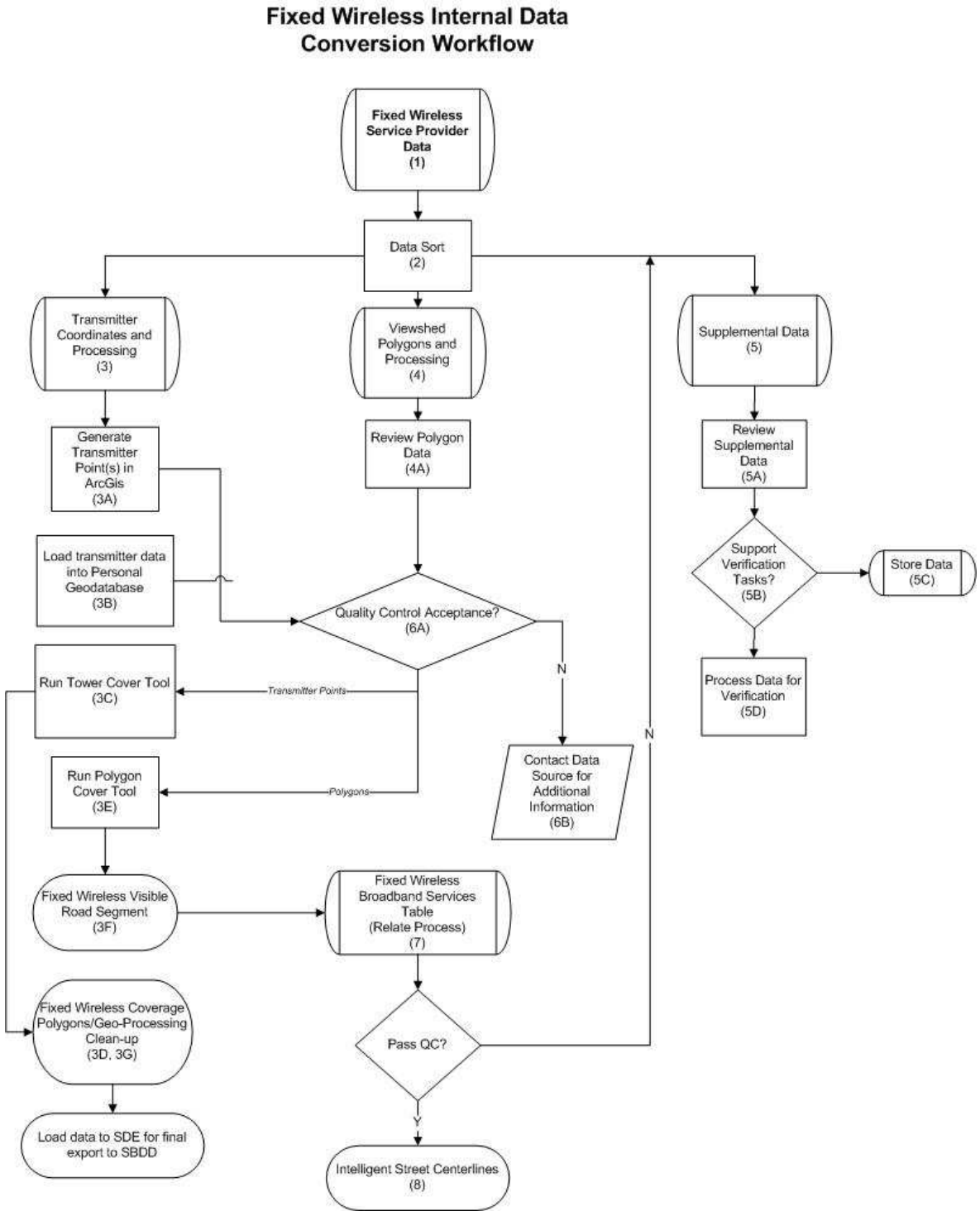


Figure 8 - Fixed Wireless Internal Conversion Workflow

(1) Fixed Wireless Service Provider Data

Service provider data gathered during the data collection phase. Data is cataloged in separate folders by provider and managed according to task and technology of transmission.

(2) Data Sort
The data sort phase of production immediately follows the data collection process. During this task, a thorough review of the service provider data determines the type of data received. Fixed wireless data generally consists of three types: transmitter coordinates and attributes, pre-defined polygons and attributes, and supplemental data. Each type of data follows unique internal processing steps.

(3) Transmitter Coordinates and Processing
Transmitter coordinate data is essentially the raw data necessary to generate a viewshed for each transmitter. In order to be processed, the transmitter source data must have certain required fields such as latitude and longitude, spot (ground elevation), equipment height at the transmitting and receiving ends, horizontal and vertical limitations, and range of transmission. The content of the transmitter data is carefully reviewed for completeness and overall consistency prior to the next step. Once completed, the data is imported into ArcGIS for continued processing and quality control.

(3B) Load Transmitter Data into Personal Geodatabase
Using the newly scrubbed .csv file, transmitter points are created in ArcGIS and the transmitter location points are displayed. A final comparison against supplemental data is performed to ensure the transmitter locations are in the correct locations. Supplemental data includes such layers as imagery, political boundaries, and road centerlines.

(3C) Run Tower Cover Tool
This tool was designed and developed by Sewall to batch process 1 or more transmitter point viewsheds. A screenshot of the tool is shown below as ***Figure 9***.

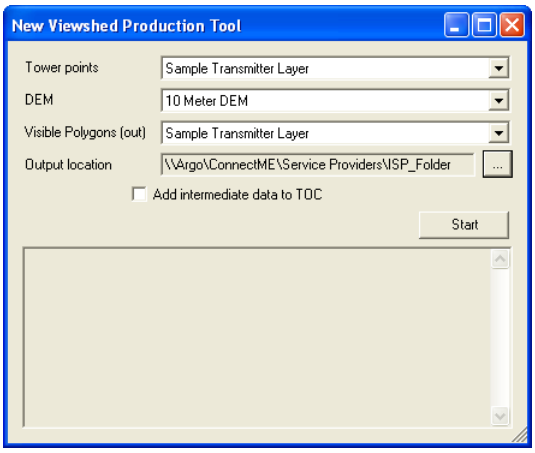


Figure 9 - Tower Cover Tool (Viewshed Production)
Tower Points: The data layer containing records of all transmitters that need a viewshed generated. Originally received from ISP and pre-processed by Sewall for format compatibility.
DEM: 10-meter digital elevation model obtained from MEGIS as the primary surface model for generating the viewshed
Visible Polygons (out): Visible polygons (only) output to an SDE layer
Output location: Location of output to personal geodatabase workspace to be used for additional processing.

(3D) Fixed Wireless Coverage Polygons

The Tower Cover Tool generates raster data sets depicting the visible and non-visible surfaces representing each transmitter. As a final output, the tool extracts the visible components of the raster data and outputs to polygon vector layers stored in the SDE environment as supplemental reference data.

(3E) Run Sewall Polygon Cover Tool

This tool was designed and developed by Sewall to facilitate several production steps.

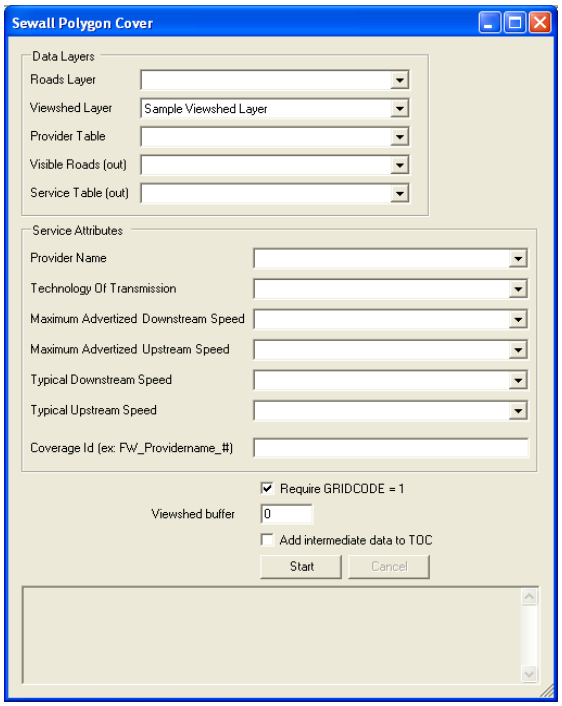


Figure 10 - Polygon Cover Tool
Data Layers: (1) Roads Layer - ConnectME Street data layer with address ranges (2)Viewshed Layer - viewshed layer used toe delineate visible polygons for clipping road segments (3)Provider Table - internal processing flag (4) Visible Roads (out) - output feature class that stores the clipped road segment geometry (5) Service Table (out) - output table that the extracted address ranges populate.
Service Attributes: These fields are populated, if data is available, to meet NTIA NOFA requirements.

(3F) Fixed Wireless Visible Road Segments

The Polygon Cover Tool clips road segments that are within visible polygon viewsheds and writes them out to a polyline vector layer stored in the SDE environment as supplemental reference data.

(3G) Fixed Wireless Geo-Processing Clean-up

The fixed wireless polygons or propagation models generated for each provider step through several geo-processing routines to check for and eliminate the following conditions:

- Single pixels less than 0.125 square miles
- Holes inside the polygons less than 0.125 square miles

- Data layer clipped to state polygon file downloaded from U.S. Bureau of the Census website, filename: tl_2010_23_state10.

In each case, all identified polygons are removed and dissolved to create multipart polygons by provider, technology, speed and spectrum. Each provider's propagation model differs in size and complexity due to the number of transmitters and their individual parameters that determine each view shed. Because the geometries are manipulated through many geo-processing procedures, multiple cycles of validation are run to ensure the geometries are in tact and repair routines are run if necessary. Once all propagation models meet internal quality control standards, the geometry is loaded to SDE and stored for final export to the SBDD deliverable format.

(4) Viewshed Polygons and Processing
Although not as common, another source of data received from the service providers is a polygon dataset that has already been generated to represent visible service territory of transmitters. Service providers or third party vendors will frequently run their own propagation models to be used for broadband mapping. Polygon formats include ESRI shapefiles, MapInfo files, Google .kml files, and raster files. Each format requires a thorough review to determine the subsequent processing steps.

(4A) Review Polygon Data
Although each format listed is unique, the data eventually runs through the Polygon Cover tool so that the address ranges within the polygons can be clipped out. Each format is carefully inspected for content, spatial characteristics and accuracy. The general workflow for each format is as follows:

- Shapefile: Review content > Edits > Project > QC > Load for processing > Run Sewall Polygon Cover Tool
- MapInfo: Review content > Translate to ESRI shapefile > Edits > Project > QC > Load for processing > Run Sewall Polygon Cover Tool
- Google .kml: Review content > Translate to ESRI shapefile > Edits > Project > QC > Load for processing > Run Sewall Polygon Cover Tool
- Raster: Review content > Translate raster to polygon > Edits > Project > QC > Load for processing > Run Sewall Polygon Cover Tool

(5) Supplemental Data
Supplemental data received by service providers is generally used for verification to support internal processing results. It is not used as a data source to generate transmitter locations or viewsheds. Supplementary data includes, but is not limited to, failed service locations, customer service locations, hard copy plots, PDF files, and other digital reference files. In most circumstances, the data can be used for cross-referencing.

(5A) Review Supplemental Data
Each format is unique and so are the processing steps that are necessary to prepare the data for use.

- Failed Service Locations: Provides an excellent source for cross-referencing to viewshed polygons (visible and non-visible) but must have complete address in order to geocode location of address.
- Customer Service Locations: Provides an excellent source for cross-referencing to the viewshed polygons (visible and non-visible) but must have a complete address in order to geocode location of address.
- Hard copy plots: May be used for verification purposes if the content of the material is applicable.
- PDF files: May be used for verification purposes if the data content is applicable.
- Other data sources: All sources are reviewed for potential use.

(5B) Support Verification Tasks
Supplemental data sources are reviewed to determine if they hold any value to the project workflow. Value added data will be stored and utilized as needed to support internal processing.

(5C) Store Data
Data received from service providers that does not have any given value to the project is organized and stored under the service provider folder.

(5D) Process Data for Verification Tasks
Supplemental data sources are scrubbed for compatibility and processed.

(6) Quality Control Acceptance
Quality control procedures are implemented at each of the three production stages depending on the data (transmitter coordinates, viewshed polygons, or supplemental data). Because the service provider data is received in numerous formats, styles, and content, much of the initial QC is completed during the data collection stage. When data is received from a service provider, an initial review is done to determine what is received and what is outstanding. This cycle of communication with the providers continues until all the necessary data is either received or clearly understood that it will not be received. Throughout the data collection process, Sewall keeps an inventory of receivables.

(6A) Contact Data Source for Additional Information
During the data collection phase of the project, questions or clarifications may have been overlooked, or items may present road blocks at some point later during the processing. If an internal quality review does not resolve an issue, the service provider is contacted for additional information or clarification.

(7) Fixed Wireless Broadband Services Table (Relate Process)
The Polygon Cover Tool has two outputs; both generated using the visible polygons created by the Tower Cover Tool: (1) road segments, and (2) calculated address ranges. While the visible road segments are not part of the NTIA deliverable, they are stored as a reference file named CONNECTME.FW_VISIBLE_ROAD_SEGMENTS.

(8) Intelligent Street Centerlines
The output from the fixed wireless workflow is a comprehensive intelligent street centerline network comprised of street centerlines and related service availability tabular records.

4.3.3 Mobile/Satellite Transmission

Wireless broadband technology consists of all facilities-based providers of wireless broadband service that is not address specific. For the State of Maine, this includes terrestrial mobile wireless and satellite broadband service. Mapping mobile wireless and satellite coverage requires less processing than other technologies that are address-based, such as wired and fixed wireless service. Data consists of polygons generated by the providers or third party vendors, representing areas where broadband service is offered. As shown in the workflow below, the data received from providers is sorted, processed and loaded into a geodatabase. Minimal steps are required to process this data, but established internal workflows are taken to ensure that proper protocols and quality assurance are met. The primary steps of the internal workflow are shown in ***Figure 11*** and described below.

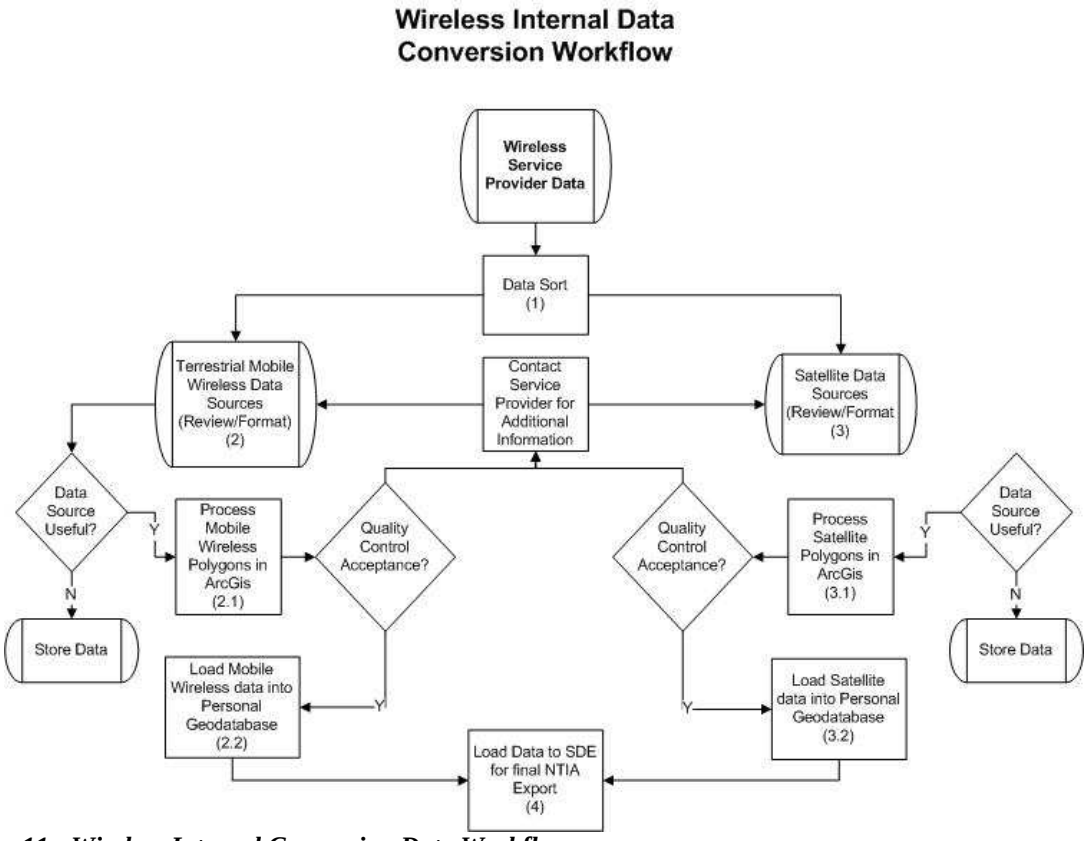


Figure 11 - Wireless Internal Conversion Data Workflow

(1) Data Sort
Upon receiving data from a mobile or satellite service provider, Sewall initially sorts and stores the data by technology - terrestrial or satellite.

(2) Terrestrial Mobile Wireless Data Sources (Review)
After the data is sorted, an initial data analysis is performed to determine if the data received appears to be intact spatially and is accompanied by the proper attribution required for adherence to the SBDD data model. Follow-up with the service provider continues until all necessary information is acquired.

(2.1) Process Mobile Wireless Polygons in ArcGIS
After determining that the data has value, the polygons are projected into the proper coordinate system to complement the internal workflow. Depending on the source data, additional data processing routines may be necessary before loading the data into the geodatabase.

(2.2) Load Mobile Wireless data into Personal Geodatabase
Although the primary quality control procedures are completed during the verification process, initial acceptance testing to ensure the data is spatially valid is performed by cross-referencing to additional data sources such as aerial imagery or information taken from the service provider website. Discrepancies are documented for use in subsequent verification processes. Once quality checks are complete, the data is loaded into a personal geodatabase

(3) Satellite Data Sources (Review)
When all the spatial and attribute information is received, the satellite data follows the same internal workflow as mobile wireless data (Steps 2, 2.1 and 2.2).

(4) Terrestrial Mobile Wireless Geo-Processing Clean-up
The propagation models submitted by each provider are run through several geo-processing routines to check for and eliminate the following conditions:

- Single pixels less than 0.125 square miles
- Holes inside the polygons less than 0.125 square miles
- Data layer clipped to state polygon file downloaded from U.S. Bureau of the Census website, filename: tl_2010_23_state10.

In each case, all identified polygons are removed and dissolved to create multipart polygons by provider, technology, speed and spectrum. Because the geometries are manipulated through many geo-processing procedures, multiple cycles of validation are run to ensure the geometries are in tact and repair routines are run if necessary. Once all propagation models meet internal quality control standards, the geometry is loaded to SDE and stored for final export to the SBDD deliverable format.

(5) Load Data to SDE for final SBDD Export
Mobile wireless and satellite data is loaded to SDE environment for final export to SBDD format.

4.3.4 Middle Mile Locations

Middle Mile and Internet Backhaul Connection Points are defined by NTIA as "interconnection points that typically enable relatively fast data rates, are built to handle

substantial capacities, and may be service-quality assured." At this stage of the mapping, middle mile data has been the most difficult to obtain from service providers during the data collection process. Service provider networks can include as little as one middle mile location such as a backhaul connection point or as many as dozens, operating as interconnection points within a fixed wireless network reaching out to end users. Furthermore, some service providers may offer middle mile connection points only as a service, such as a splice into a fiber line to support a lateral to a central office or business.

Regardless of the technical framework, all middle mile locations that meet the NTIA definition are captured in a point feature class with additional attribution including the ownership of the facility, serving facility capacity and serving facility type.

The outline of workflow is shown as ***Figure 12***. The description of each step follows.

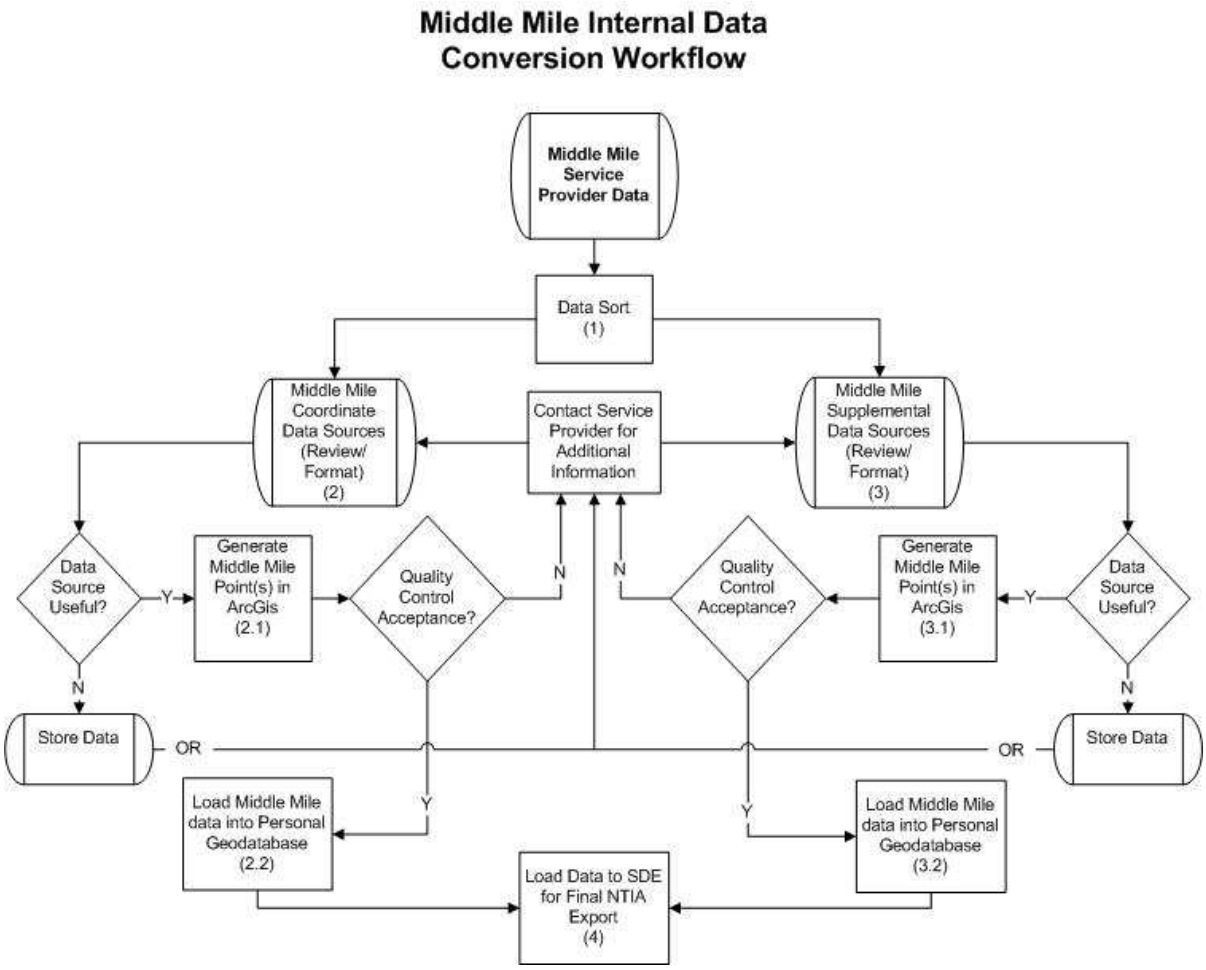


Figure 12 - Middle Mile Internal Data Conversion Workflow

(1) Data Sort

The initial data sort separates the data and distinguishes formats more compatible to the database model, such as middle-mile coordinate values listed in a spreadsheet or ESRI shapefiles. Data received in compatible formats require minimal processing steps. Supplemental data sources generally require additional processing steps. Examples may include the conversion of .kml files to ESRI shapefiles or polyline files that require points to be added at splice or lateral connections.

(2) Middle Mile Coordinate Data Sources Review

Sewall reviews the data to ensure that the information is a valid input. If so, the data is reformatted and loaded into in ArcGIS. Sources deemed as invalid are stored, or the service provider is contacted for additional information if necessary.

(2.1) Generate Middle Mile Points in ArcGIS

Points are loaded into ArcGIS. Sewall analysts run acceptance procedures to verify data translation to ArcGIS and spatial accuracy and completeness using supplemental data sources provided such as addresses, imagery or descriptive information about the point locations. In addition to the point geometry, all attribution carried over in the translation is confirmed.

Conflicts or questions are referred back to the service provider for further clarification if necessary.

(2.2) Load Middle Mile Data into Personal Geodatabase
Middle-Mile data is loaded to a personal geodatabase. Additional data received by the service providers or revisions will cycle through the same process and be stored in the personal geodatabase prior to loading to the SDE environment for final export.

(3) Middle-Mile Supplemental Data Sources (Review)
Supplemental data sources may involve additional processing during this step in order to proceed. Some of the more common supplemental data sources include, but are not limited to, the following:

- Google .kml files
- .jpg images showing middle-mile locations
- AutoCAD point or polyline files
- e-mails with descriptions of locations
- Other miscellaneous information

Once the data has been fully reviewed and normalized, the remaining steps follow the same internal workflow as coordinate data sources (Steps 2.1 and 2.2).

(4) Load Data to SDE for final SBDD Export
Middle mile data is loaded from the personal geodatabase to the SDE environment for final export to SBDD format.

4.3.5 Service Overview

Broadband service providers that participate in the state broadband mapping project have been asked to provide broadband service territory footprints at the address, street, census block or county level. The service overview dataset contains the information that has been delivered at the county level.

The workflow developed by Sewall integrates the gathered data from broadband service providers into a consistent spatial format that is stored in a geodatabase designed to be compatible with the SBDD deliverable.

The service overview workflow is described below and depicted in ***Figure 13***.

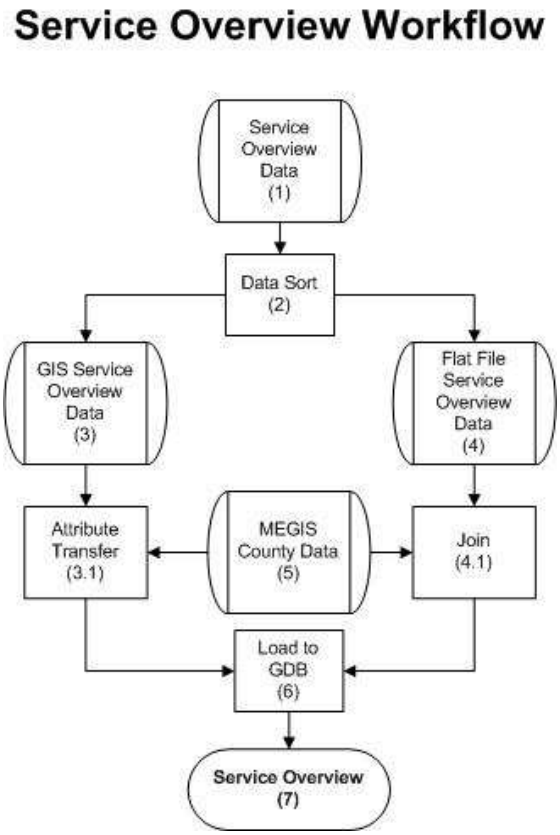


Figure 13 - Service Overview Workflow

(1) Service Overview Data
The Service overview data bin is the storage location for service overview specific broadband service provider data gathered by Sewall. Sewall specifies what information is necessary for this deliverable and what formats are acceptable when contacting each provider during the data gathering phase of the project.

(2) Data Sort
The service overview data is sorted into categories by data type.

(3) GIS Service Overview Data
The GIS data bin is used to store provider data that has been delivered to Sewall with service overview attribution and is in the requested GIS format.

(3.1) Attribute Transfer
Attributes contained in the GIS data are sent through an attribute transfer process that populates county data from the MEGIS County data. This step ensures that there is one consistent spatial dataset utilized as a basemap in the service overview.

(4) Flat File Service Overview Data
The flat file data bin is used to store provider data that has been delivered to Sewall with service overview information in a flat file format.

(4.1) Join
Using county name information provided in the flat files the MEGIS county data is joined to the flat files. The joined dataset is exported and stored in the GIS service Overview data bin.

(5) MEGIS County Data
The shapefile cnty24p.shp was downloaded from the MEGIS website (megis.maine.gov) and utilized for county spatial representation of the service overview dataset during the workflow.

(6) Load to Geodatabase
Once the service overview data has been processed, the data is reviewed for content and accuracy and then loaded to the ConnectME production database.

(7) Service Overview
The output of the service overview workflow is a polygon dataset that is compatible with the SBDD data model.

5 Validation

The validation process is used to ensure that the data delivered is in fact valid and current. Methods used by the Maine team to validate coverage areas include:

- field tests with mobile devices
- responses to surveys sent to residents and businesses
- comparison with third-party datasets both private and governmental
- crowdsourced data (speed test results and feedback forms)

Once the data has been collected, processed and verified, the results are statistically analyzed and plotted atop the original provider data coverages in GIS. Any 'holes' or inconsistencies in the data from the service provider are reported to the provider in a feedback loop to ensure all parties involved are aware of the potential issues with the broadband service in an area.

5.1 Field Tests for Mobile Coverage

Mobile coverage consists of data from providers who offer mobile broadband services to consumers through devices such as smartphones or mobile laptop aircards. Common providers of this type of broadband service in Maine are AT&T, Verizon Wireless, and Sprint.

In order to verify the existence of wired and fixed wireless coverage in an area, direct access to the provider's service is needed. Logistically this would be difficult because transmission receivers, accounts and other equipment would have been required for each of the providers. Instead, the project team opted to gather information through other means, so field tests were only conducted to validate mobile coverage.

Mobile coverage data is received by Sewall from the service providers in the form of GIS polygon files. After these files have been reviewed and properly projected (see **Section 4.3** for details), they can be analyzed in the verification process. The mobile coverage file is compared against the State of Maine boundary file in a GIS application in order to assess the size and location of the coverage area with respect to the State.

5.1.1 Methodology

The methodology developed by the ConnectME Authority to verify mobile coverage in Maine is to select a series of points throughout a provider's coverage and have field crews run tests at these predetermined locations. A minimum of 37 points per coverage area are needed in order for the statistical analysis on the field data to be valid (see Section 5.1.2 for how this was determined).

To select the points for field verification, a 28-square-mile grid was created in GIS and layered with the provider's coverage area, the E911 road layer and the state boundaries. One point was placed per grid block within the provider's coverage network. Each point was placed on a road, usually at road intersections for ease of access by the field crew. Once all

the points were placed, the points were divided into groups for distribution to field crew personnel.

The points were assigned attributes of point ID, latitude and longitude. The attribute table was then exported to an Excel file for further editing. The columns: field connect, upload speed, download speed and notes were added to the spreadsheet. The field connect column holds values to describe whether the field crew was able to log on to the provider's network., speeds collected from the state website at that location are stored in the upload speed and download speed columns. The spreadsheet was loaded onto the field laptops for data entry.

Crews utilized Microsoft Streets & Trips to assist in navigating to each of the field points across the state. The software, which was loaded on each of the field laptops, has a GPS component that could track and direct field crews. The spreadsheet used for data entry was also loaded into the software so the points could be plotted based on given coordinates. The field crews could properly identify each of the points based on the Point Name attribute.

The program turned each of the points into a "stop." The start and ending points of the trip were also added, allowing the software to calculate an optimized route to reduce driving time and mileage. After optimization, the software also provided driving directions, which were saved and loaded onto the field laptops.

Mobile broadband aircards from each of the mobile service providers were purchased outright directly from the providers. This eliminated the need for a service contract so that the aircards can be deactivated after the verification process without a contract cancellation fee. Service providers activated the mobile aircards with a month-to-month data package of 5GB.

Aircards from each of the providers were then loaded onto the field crew laptops. The software from the aircards was installed, aircard functionality was checked, and any updates were installed prior to crews leaving the office.

Each time verification tasks are performed, the points are visited by a field crews who are equipped with a field laptop enabled with the mobile broadband aircard of the corresponding service provider and proper navigation information. The field crews drive to each of the points, log onto the service provider's network and navigate via Internet Explorer to an internet speed test website created by the James W. Sewall Company specifically for the ConnectME Broadband Mapping Project.

For each test point, the point number, service provider and date are entered into the internet speed test website (e.g., Test_745_verizon_20120821) and a test is executed. Results are recorded both in the speed test database (automatically) and in the spreadsheet. Once all of the points are completed, crews return to the office and spreadsheets are combined. Data columns are filled in with corresponding broadband upload and download speeds for sites with connectivity.

Data points are then plotted on maps to view where broadband coverage is full strength or where it is lacking. If there are large 'holes' in the coverage areas, the points are revisited to ensure that readings were accurate and not subject to user or equipment error.

5.1.2 Statistical Process Validation

Large data sets are often expressed best in terms of summary statistics. It is often easier to look at commonly defined statistics (stats) to get a quick overview of what the data describes, than to look at all the raw data. A sample set of data points field testing was selected. The following steps were taken to ascertain that the sample set was statistically representative of the actual data.

In analyzing this data, we chose statistics using the following criteria:

- Commonly used and understood
- Fit the data (data type) in question
- Had practical application to the reader in understanding what the data was describing

We believe that the statistics presented can be beneficial in several ways:

- Description/Summary: they consolidate many data observations into a few summary stats that can be quickly compared
- Quantification: they describe which portion of the data falls within or outside of the limits of acceptable criteria
- Reliability/Prediction: in some cases, they attest to the reliability of the data collection

The following statistics were used:

- Number of samples (n): number of data points in the sample
- Average (xbar): arithmetic mean or the mean value of a set of integers, terms, or quantities, expressed as their sum divided by their number.
- Standard Deviation (sd): used as a measure of the dispersion or variation in a distribution, equal to the square root of the arithmetic mean of the squares of the deviations from the arithmetic mean.
- Percentages (%): a proportion or share in relation to a whole; a part; a fraction or ratio with 100 understood as the denominator (e.g., 0.98 equals a percentage of 98).
- Hypothesis testing: statistical process used when trying to determine if it is reasonable to conclude that the entire population possesses a certain characteristic by the analysis of a sample.

Explanation of choices made:

- Quantitative statistics were only applied on sample data that fell within the published service area of the provider in question. This was possible because the area was

"bounded" by the geographic area described in the "service area." Outside the service area there is no bound (limit), so these same statistics would not be reliable as used with our methodology.

- Assumed a normal distribution because this is the most common and typical distribution type for this type of data, and we had no evidence to counter this assumption.
- Chose sample statistics because we were not dealing with the whole population (almost unlimited sample points possible).
- Chose hypothesis testing because we wanted to have the most valid predictor of the population parameters given the variability of our sample data.
- Chose student's T-distribution when sample size was equal to or less than 30 (n=<30) and Z-test when populations were above 30 (n>30).
- Used one-tailed tests because we were interested in the area above the curve from a single lower parameter (criteria of minimum speed).

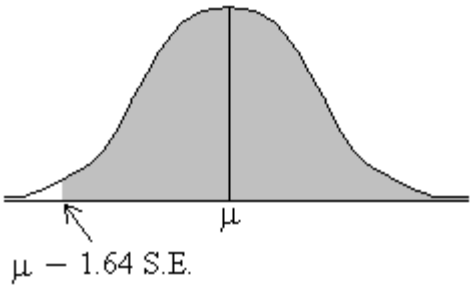
Data was sorted to yield only those sample points that fell within the published service area of the provider in question.

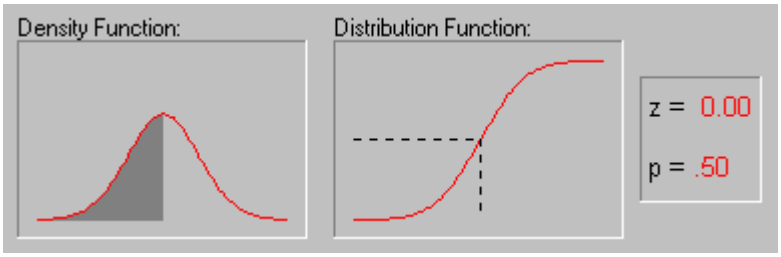
Then the following information was calculated:

- n = number of total sample points
- Degrees of Freedom (df) = n-1
- Selection of t-distribution (df < 30) or standard normal curve (df >= 30)
- Percent of points where connection was established
- Percent of points where both tested upload and download speeds were equal to or greater than (=>) broadband speeds (200 and 768 kb/sec respectively).
- Percent of points where either the upload or download speed was equal to or greater than (=>) broadband speed, but not both.
- Percent of points where neither the tested upload or download speeds was equal to or greater than (=>) broadband speeds.

Using all data points within the designated service provider coverage that registered an upload speed during the test, the following were calculated:

- Average # of points where a connection was made that had an upload speed equal or greater than broadband minimums.
- Average upload speed (xbar/upload)
- Standard deviation of the sample (SD/upload)
- Statistical prediction of percent of points that would meet minimum 3G upload speed in subsequent samplings (using one-tailed t-test or z-score, depending on df) – see schematic below





Using all data points within the designated service provider coverage that registered a download speed during the test, the following were calculated:

- Average # of points where a connection was made that had a download speed equal or greater than broadband minimums.
- Average download speed (xbar/download)
- Standard deviation of the sample (SD/download)
- Statistical prediction of percent of points that would meet minimum 3G upload speed in subsequent samplings (using one-tailed t-test or z-score, depending on df) – see schematic above.

The sampling method was determined to be valid. ConnectME is collecting enough sample points to be a statistically valid representation of the data.

5.2 Surveys

The project team is surveying residents and businesses in Maine utilizing a questionnaire about their current internet connections. The ConnectME Authority has opted begin the verification of residential broadband service with a pilot survey.

5.2.1 Pilot Residential Survey

According to the 2000 Census, there are approximately 518,000 households in Maine, of which 10,000 were included with the pilot survey. Residential addresses were purchased from InfoUSA for the mailing as 2,500 addresses in each of four geographic areas: Maine North, Maine South, Maine East, and Maine West. Addresses were selected at random by InfoUSA from the provided GIS polygons constituting adjacent census blocks in each area containing approximately 5000 households.

The survey questionnaire is comprised of 10 questions and takes about two minutes to complete. A copy is included in **Appendix E**.

The survey identifies the consumer by the physical address, which is geocoded against a street centerline file in GIS to create a point file. The data associated with each address (e.g., transmission type and provider) is analyzed by layering the consumer information with the coverage data provided by the service provider. Sewall can analyze the layers to verify if each service provider does cover the areas represented by the data it submitted. In addition, if an area shown to have no service by a provider appears in the consumer survey, the provider in question can be contacted to confirm and provide updated coverage information.

There is also an online version of the survey that people can access by navigating to a link indicated on the delivered hardcopy of the questionnaire. The electronic version, once completed, directs the person to the ConnectME internet speed test website, which reports the upload and download speeds of the user's internet connection. The speeds are recorded in a database that tracks entered physical address and speed test results for future analysis (see Section 5.4.1 for further details).

5.3 Third Party Data

The Maine team has acquired data from Mosaik Solutions (American Roamer) and from the FCC. These datasets will be used to validate the mapped coverage for each provider through spatial analysis.

5.3.1 Mosaik Solutions data

Maine acquired Mosaik Solutions (American Roamer) data, which includes coverages for Sprint, Verizon Wireless, AT&T and T-Mobile. The data consists of polygon shapefiles, which Sewall could overlay with the coverages received from the providers. For each provider, the area in common and the area covered only by one dataset were determined from geospatial analysis. Differences are used for analysis and refinement of the service territory.

5.3.2 FCC Form 477 aggregate data

The FCC has provided SBDD grantees and their teams access to the FCC Form 477 aggregate data. This data contains information on service providers in Maine at an aggregate or granularity higher than the SBDD data, but is useful for checking the list of providers and their locations at Census Track level.

The project team has recently developed a tool that compares the records in the Form 477 aggregate data to the provider data in the SBDD project database. The tool lists out by Census Track each provider that includes the tract in the Form 477 filing. Each provider that has service data that falls within the tract is considered a match. Using this data, the team has been able to find potential providers that were not previously included in the study, as well using the tract locations as a cross-reference to where each provider has service. The team has plans to further enhance the tool to provide a set of results centric to each provider.

5.3.3 Maine Office of GIS E911 data

The Maine Office of GIS (E911 Services Group) provided the Maine team with a listing of the first and last address of each street in the E911 database, along with a count of households located on each street. This is referenced as the Automatic Location Identification (ALI) database. As a first step in the validation process, the information in this file was cross-referenced to each broadband provider in our broadband mapping database. As a result, potential coverage gaps in broadband service were flagged and prioritized based on the number of household counts for the street. Gaps with potential high household counts were given a higher priority than those with minimal households. The Maine team has completed this initial validation step and is currently developing follow-up procedures to target the gaps with high priority flags.

5.4 Crowdsourced Data

5.4.1 Speed test results

For the SBDD project, the ConnectME Authority has implemented an online speed test tool. The website was developed by Ookla Net Metrics and was brought online on January 13, 2010. To date, over 12,000 tests have been recorded. The speed test stores downstream and upstream speeds as well as the user's address and ISP. The results from the speed test tool are scrubbed and geocoded. The information will be used to help verify service coverages and service speeds for wired, fixed wireless, and satellite providers.

5.4.2 FCC Consumer Broadband Test (CBT) data

The Consumer Broadband Test data provided by the FCC consists of three datasets: Speed Test records, Mobile Broadband Speed Test records, and Broadband Dead Zone Report records. The project team plans to incorporate the FCC speed test records along with those records captured by the ConnectME speed test tool. However, the name of the service provider is not included with data, so a method for mapping the IP address in these records to the appropriate provider must be developed.

The dead zone reports are used to identify locations reported to be without coverage. The addresses from these records are geocoded and then are cross-referenced with service provider coverages in the areas.

5.4.3 Public feedback records

As part of the interactive broadband availability map website, the ConnectME Authority has included a form for public feedback on the results of an address level search on broadband service. Using the form, someone can enter information regarding broadband at his/her location. The feedback records are used to help identify areas where broadband service may be in question. This information is offered back to the service providers as part of the Feed Back Loop process (section 5.6). Based on the response from the provider, the project team may adjust the broadband service coverage in these areas.

5.5 Service Locations / Failed Service Locations

Service providers are encouraged to submit service locations and/or failed service locations to help validate extents of service coverage. The service addresses and failed service addresses are geocoded and the data is analyzed with the coverage data submitted by the service provider. This validation step will continue throughout the project as the team continues to receive these locations as part of the providers' data submittals.

5.6 Feedback Loop

Once broadband service territories are mapped, Sewall generates maps for each provider company representing the status of data at the time of the mapping. This gives each service provider the opportunity to validate its broadband service footprint and provide feedback to the Sewall project team. ***Figure 14*** below represents a fixed wired validation map where a provider company's broadband service (DSL) foot print is symbolized in red. Depending on the size of a service footprint and map density, additional information, such as road names, may be represented.

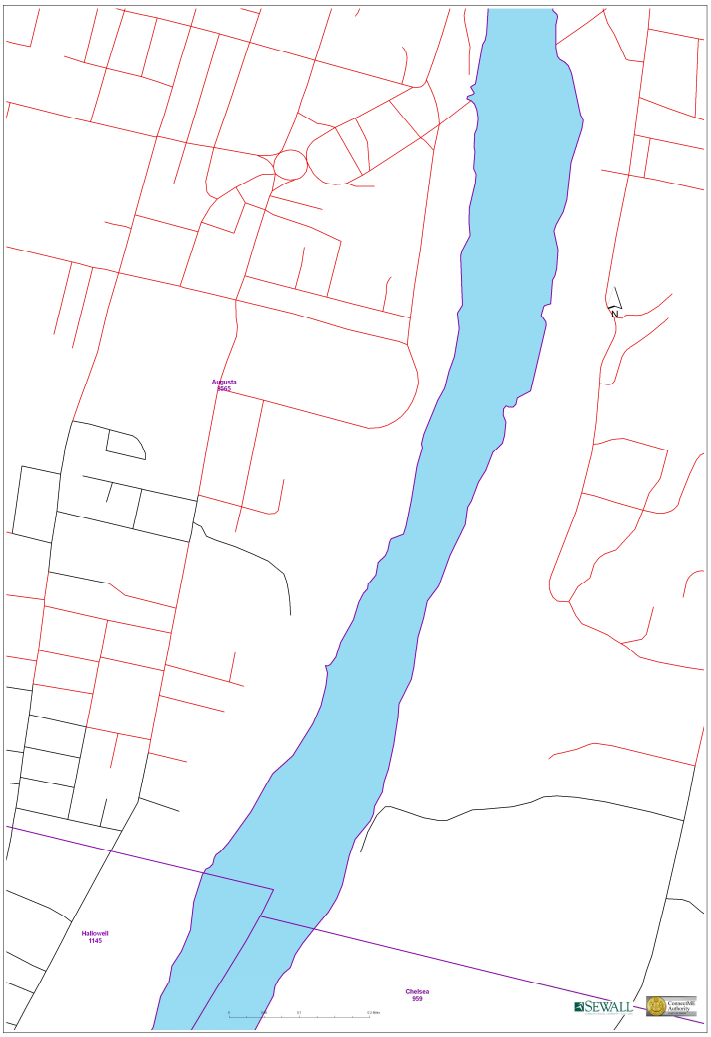


Figure 14 - Fixed Wired Validation Map

Sewall forwards the maps of the service territory, along with any anomalies noted from the third-party and crowd-sourced data including the public feedback records to each service provider. Sewall communicates regularly with each provider to ensure that the mapping is as comprehensive and correct as possible.

Sewall also generates maps for mobile service providers showing the coverage and service levels according to FCC and NTIA standards. ***Figure 15*** below represents a sample validation map showing FCC-defined levels of service. Town lines and town names are shown.

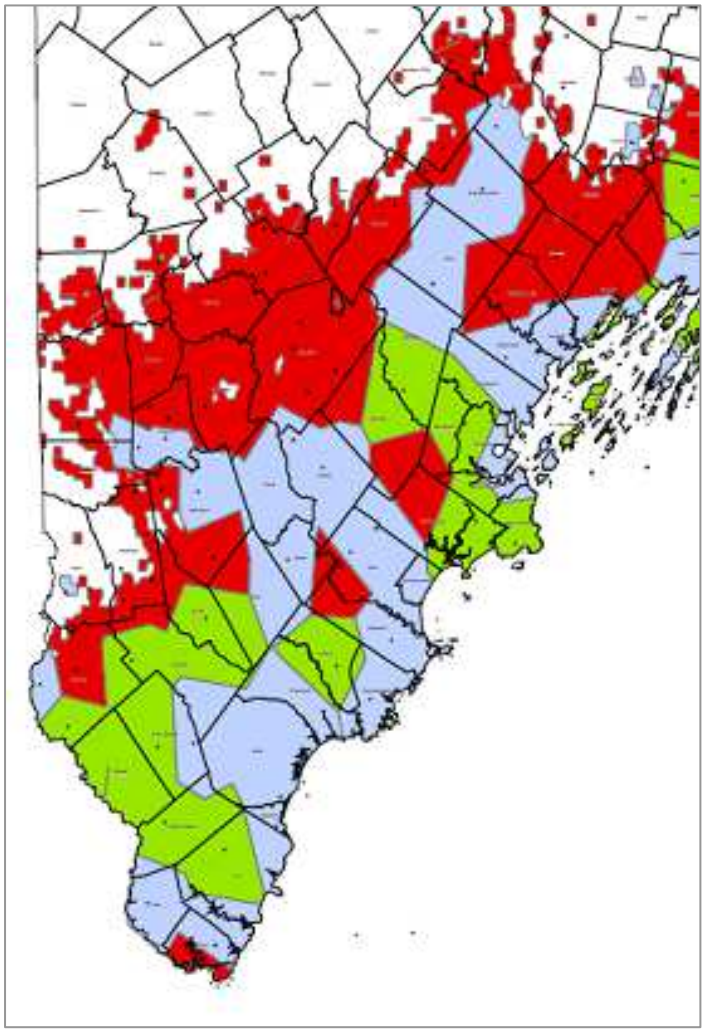


Figure 15 - Mobile Validation Map

5.6.1 GeoPortal Transfer Site

In August 2011 Sewall deployed a web-based GeoPortal site to manage all data transfers related to the ConnectME Authority Broadband Mapping Project, see ***Figure 16***. Each broadband service provider has a secure password-authenticated account set up which allows

designated users to upload and download digital data. All users receive an e-mail notification when their account is set up.

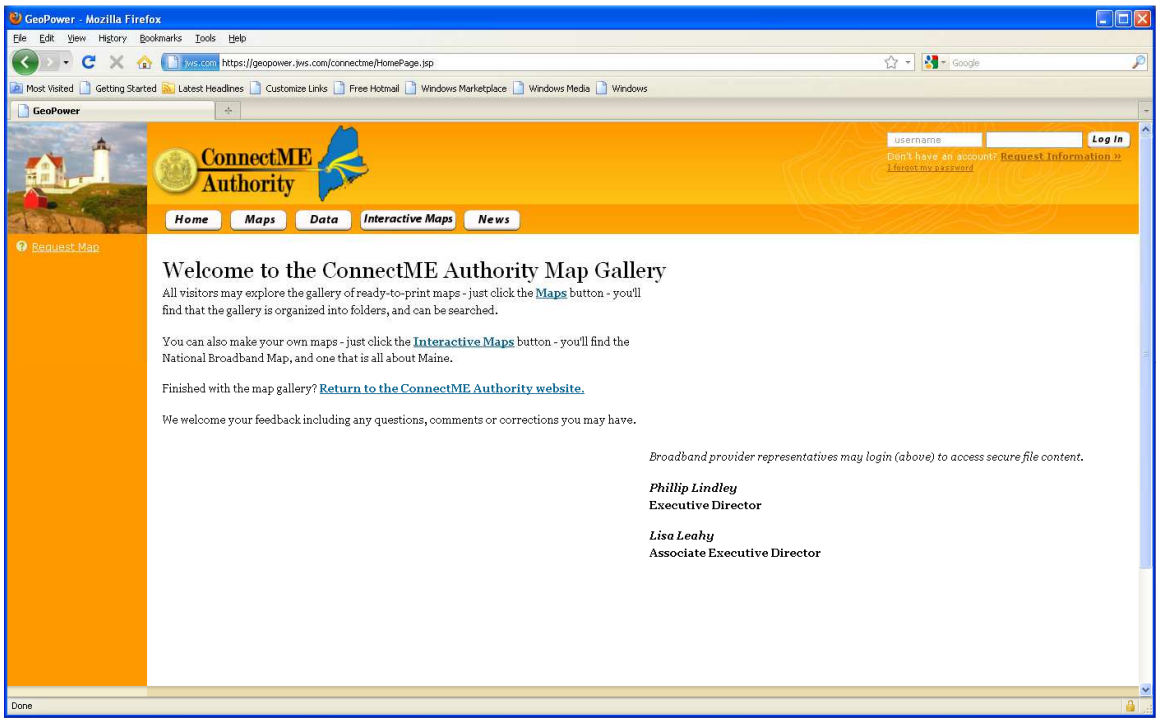


Figure 16 – Screenshot of GeoPortal web site

Data exchanges between Sewall and the service providers will include, but not be limited to, data round submissions, validation maps and other miscellaneous correspondence. In addition to data transfers, the GeoPortal will also be used by the general public for viewing the static maps posted in the map gallery. Currently the map gallery contains statewide maps representing FCC speed tier coverages, broadband service availability for Maine house and senate legislative districts and grant overview maps depicting awarded ConnectME Authority grant applications throughout the state.

6 Data Delivery

Service provider data that has been processed to the Sewall production model needs to be transferred to the SBDD data model for delivery. In order to accomplish this Sewall has developed a process by which the Sewall production datasets are exported to the current SBDD data model structure.

The Sewall production model was designed with the NTIA delivery model in mind and, in as many cases as possible, the production model utilizes the NTIA delivery defined attribute definitions and domain values. Through the use of this design philosophy, Sewall has mitigated the pitfalls for exporting to the SBDD data model.

To facilitate the transfer of data stored in the Sewall production model to the SBDD model for delivery Sewall has developed an ArcCatalog tool named State Broadband Data Export. This tool reads a source geodatabase set of features and writes to a destination geodatabase set of features. A screenshot of the tool dialog box is shown in ***Figure 17***.

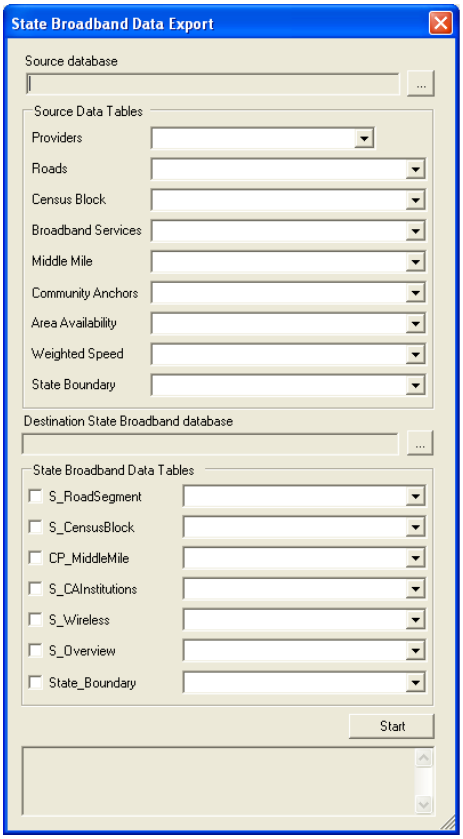


Figure 17 - State Broadband Data Export Tool
Source database: Sewall production geodatabase location.
Source Data Tables: (1) Providers - Geodatabase table with list of provider specific information (2) Roads - ConnectME street centerline feature class (3) Census Block - Census 2010 block geodatabase feature class (4) Broadband Services - Geodatabase table containing broadband provider characteristics and street ranges linked to ConnectME street centerline segments (5) Middle Mile - Geodatabase point feature class containing broadband service provider middle mile locations (6) Community Anchors - Geodatabase point feature class

containing community anchor institution locations (7) Area Availability - Geodatabase polygon feature class containing mobile wireless and satellite broadband provider coverage (8)Weighted Speed - Geodatabase polygon feature class service overview data (9) State Boundary - Geodatabase polygon feature class portraying the Maine state boundary.
Destination State Broadband database: SBDD geodatabase location.
State Broadband Data Tables: These are the required SBDD deliverables.

On launching the ArcCatalog tool, the user selects the source and destination geodatabases for the transfer process. The source geodatabase is the Sewall internal production model, and the destination geodatabase is the empty SBDD model. Next the user matches the items listed in the Source Data Tables section to the production model features. Once complete, the user checks which deliverables the tool will export in the State Broadband Data Tables section. Clicking 'Start' will begin the export process.

The road segment and census block exports are performed simultaneously in the State Broadband Data Export Tool with road segments being reported in census blocks greater than 2 square miles and census blocks being reported in areas up to 2 square miles. The tool reads the service provider data stored in the Sewall production geodatabase and performs an analysis through which the deliverables are extracted. The analysis process by which the tool extracts the road segments and census block data is outlined in the whitepaper entitled "Misalignment between Census Blocks & Maine E911 Streets: Technical Whitepaper," dated 30 September 2011. This paper is included in **Appendix D**. The switch from 2000 Census Blocks to 2010 Census Blocks for the October 1st 2011 delivery caused the team to re-evaluate the export process as the 2010 Census Blocks were reported to be a closer match to the Maine E911 street dataset. The finding of that study revealed that the 2010 Census Blocks still had spatial misalignments with the Maine street dataset and the conclusions of the study in **Appendix D** are still valid.

Once the census block data has been exported it is run through a QC routine. As the census blocks are created from broadband data at the street level and there is a spatial misalignment between the two datasets erroneous data can be created through the export process. The exported census block data is checked against the baseline broadband street dataset for inconsistencies.

Middle mile and community anchor institution data are stored as point features in the Sewall production model and are extracted utilizing a standard export routine. The datasets are reprojected from the production UTM projection to the SBDD WGS84 projection and LAT/LON attributes are populated. Once complete, the points are loaded into the destination feature classes of the SBDD geodatabase.

Wireless, service overview and state boundary data are stored as polygon features in the Sewall production model and a standard export routine extracts these to the SBDD features. The datasets are reprojected from the production UTM projection to the SBDD WGS84 projection as features are loaded.

Address data that has been collected is stored as point features in the Sewall production model and exported to the SBDD geodatabase using standard export routines within ArcGIS.

During the export process features with front-end business rule violations get reported. The report is than reviewed by a Sewall analyst, and necessary corrections are made to the base datasets. This reporting mechanism ensures the data delivered in the SBDD geodatabase is as complete and accurate as the provided data sources allow.

Once the SBDD transfer file geodatabase has been created and its content validated, the geodatabase files are included in the data submittal zip file along with the other submittal files including 'datapackage.xls,' schema modifications report, data verification summaries, and this technical whitepaper.

Appendix A - Sample Letter to Service Providers

SEWALL
JAMES W. SEWALL COMPANY / Since 1880

[date]

Sewall
P.O. Box 433
136 Center St.
Old Town, ME 04468
207-827-4456

[address]
[address]
[address]
[address]

Dear Mr. [name]:

The National Telecommunications and Information Administration (NTIA) of the U. S. Department of Commerce has been charged by Congress under the American Recovery and Reinvestment Act of 2009 and the Broadband Data Improvement Act (BDIA) to develop and maintain a comprehensive, interactive, and searchable nationwide inventory map of existing broadband service capability and availability in the United States that depicts the geographic extent to which broadband service is deployed and available from a commercial or public provider throughout each state (the Program).

The ConnectME Authority (the Authority) is responsible for developing and maintaining these data for the State of Maine and for serving as the conduit for this information to the NTIA. The Authority has contracted with James W. Sewall Company of Old Town, Maine, to undertake the initial mapping and to consult with the Authority on how best to update and maintain these data going forward.

We are writing to insure that you are familiar with this Program and to invite your collaboration in teaming with us in this important, statewide initiative. (See the URL's provided at the end of this letter for further information.) Indeed, your organization's collaboration is essential to the Program's success, and we thank you in advance for your participation.

To comply with the Program, the NTIA requires each state to provide structured data that includes:

- the availability of broadband service at the address level;
- advertised and "expected actual" speeds of broadband service;
- the technology used to deliver broadband service;
- location and capability of critical broadband related infrastructure (this data will not be publicly displayed on the national broadband map);
- the spectrum used by wireless broadband service providers.

We expect that the publicly searchable national broadband map and database will contain:

- geographic areas in which broadband service is available;
- the technologies used to provide broadband service in such areas;
- the speed at which broadband service is available in such areas;
- broadband service availability at public schools, libraries, hospitals, colleges, and all public buildings used by the state or municipalities.
- other economic or demographic data that may enable Federal efforts to provide usable and searchable data on a variety of issues pertinent to the public interest.

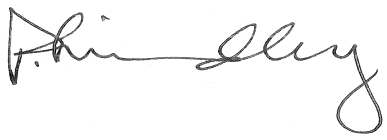
We recognize that some of the data we will ask you to provide is proprietary. Consequently, we include a Protective Order authorized by the ConnectME Authority and an accompanying non-disclosure agreement (NDA) for your review and execution. Please note, however, that the NTIA requires that this NDA may not restrict the Authority from providing all data collected to the NTIA or restrict the NTIA's use of such data as contemplated under this Program, including sharing such data with the FCC or other federal agencies. Furthermore, the NTIA prohibits the Authority or Sewall from agreeing to a more restrictive definition of Confidential Information than that adopted by the NTIA. Currently, as required under the BDIA, the NTIA identifies Confidential Information as any information, including trade secrets, or commercial or financial information, submitted under the Program that:

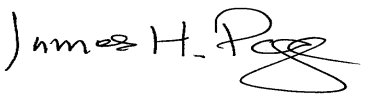
- identifies the location, type and technical specification of infrastructure owned, leased or used by a specific broadband service provider; or
- explicitly identifies a broadband service provider in relation to its specific service area or at a specific service location.

Confidential Information will not be made publicly available pursuant to the limits set forth in the BDIA except as required by applicable law or judicial or administrative action or proceeding, including Freedom of Information Act requirements. From the BDIA (§ 106(h)): "Notwithstanding any provision of Federal or State law to the contrary, an eligible entity shall treat any matter that is a trade secret, commercial or financial information, or privileged or confidential, as a record not subject to public disclosure except as otherwise mutually agreed to by the broadband service provider and the eligible entity." Sewall was chosen to lead this task in part because of its long history of handling confidential information for a variety of industries. Finally, should your organization apply for a Broadband Technology Opportunities Program (BTOP) grant to support the deployment of broadband infrastructure in unserved and underserved areas, enhance broadband capacity at public computer centers or to encourage sustainable adoption of broadband service, the NTIA requires that you participate in this mapping Program.

The NTIA has set a very aggressive Program schedule, with many deliverables due by November 2009 and all initial deliverables due in March 2010. Consequently, a representative from the Sewall team will be contacting you soon to discuss any questions you may have and to facilitate completion of the NDA and your participation. If we should be in communication with others in your organization concerning either the NDA or the data transfers, please inform the Sewall representative as soon as possible. Thank you again and we look forward to working with you.

Sincerely,





Phillip W. Lindley, Executive Director
ConnectME Authority

James H. Page, CEO
James W. Sewall Company

URLs for:
www.maine.gov/connectme
www.ntia.doc.gov/press/2009/BTOP_mappingtotals_090909.html

Appendix B - ConnectME Authority Protective Order

STATE OF MAINE December 21, 2009

CONNECTME AUTHORITY PROTECTIVE ORDER
(Proprietary Business Information)

Pursuant to 35-A M.R.S.A. § 9207(1) and Rule Chapter 101, § 4, the ConnectME Authority (Authority) may designate information as confidential to protect the legitimate competitive or proprietary interests of communications service providers and mobile communications service providers. The Authority may designate information as confidential only to the minimum extent necessary to protect such legitimate competitive or proprietary interests. Information designated as confidential is not a public record under 1 M.R.S.A. § 402(3).

The Authority is currently conducting a Broadband Mapping and Inventory Project with the services of a private contractor, James Sewall Company (Sewall). Sewall is required to obtain data from service providers (Provider) by the Authority and the National Telecommunications and Information Administration (NTIA) pursuant to the Broadband Data Improvement Act (BDIA) and the NTIA Notice of Funds Availability (NOFA). The NTIA requires that the Authority agree to comply with confidentiality requirements in section 106(h)(2) of the BDIA.

It is anticipated that providers submitting data to Sewall or the Authority may have a need to provide information considered to be confidential, in that the information provided may involve commercially sensitive and/or proprietary information regarding information that identifies (i) the location, type, and technical specifications of infrastructure owned, leased, or used by providers or (ii) explicitly identifies providers in relation to their specific service area or at a specific service location (collectively, the "Confidential Information"). The Authority has determined that such Confidential Information is generally not disclosed publicly, and that the public disclosure of such Confidential Information without restriction would cause competitive harm to the applicant or provider.

Accordingly, the following terms shall apply unless and until modified by the Authority or a court of competent jurisdiction:

1. Data submitted to Sewall or the Authority falling within the above definition of Confidential Information, as well as any data submitted to Sewall or the Authority pursuant to the Non-Disclosure Agreement set forth in Attachment A , (collectively, "Designated Confidential Information") shall be deemed to be competitively sensitive and/or proprietary in nature and such Designated Confidential Information shall be and remain exempt from public disclosure pursuant to the terms of this Protective Order and the articles referenced therein.

2. All Designated Confidential Information shall be and remain exempt from public disclosure pursuant to the terms of this Protective Order, unless removed from the coverage of this Protective Order as provided below or otherwise by a court of competent jurisdiction. No persons provided access to any Designated Confidential Information by reason of this Protective Order shall use such information for any purpose other than the purposes designated by the Authority. Every person provided access to Designated Confidential Information shall use his or her best efforts to keep the Designated Confidential Information secure and shall not publicly disclose it or accord public access to it to any person not authorized by the terms of this Protective Order.

3. Any person or the Authority may challenge the designation of any document or other information as Designated Confidential Information. The Authority will provide reasonable prior notice to the applicant or provider and an opportunity for hearing prior to ruling on any such challenge. In considering any such challenge, the usual burdens of proof and production shall apply and no additional presumption shall be given as a result of the prior acceptance by the Authority of material as Designated Confidential Information. In the event the Authority should rule over the objections of the person providing the Designated Confidential Information that any information should no longer be subject to the terms of this Protective Order, such information shall not be publicly disclosed until the later of five (5) business days after the Authority so orders

or, if the person files within such five day period an appeal or request for stay of such order, the date upon which such appeal or request for stay is decided; provided, however, that said periods may be extended in accordance with any stay ordered by the Authority or a reviewing court. Upon the entry of a final unappealed decision by the Authority or a reviewing court granting public disclosure, the terms of this Protective Order shall cease to bind any person with respect to the information that the order granting disclosure shall have expressly and clearly removed from the coverage of this Protective Order.

4. Any person provided access to Designated Confidential Information shall review and be bound by the terms of this Protective Order. Prior to obtaining access to any Designated Confidential Information, such person shall sign an acknowledgment of his or her obligation to abide by the terms of this Protective Order in the Non-Disclosure Agreement (NDA) attached hereto as Attachment A.

5. Unless modified by the Authority or a court of competent jurisdiction, access to Designated Confidential Information shall be limited to Authority Staff, Sewall, any independent consultants or experts retained by the Authority, the National Telecommunications and Information Administration, and those designated persons, who have signed the NDA.

6. No copies of Designated Confidential Information shall be circulated to persons other than those authorized under paragraph 5 of this Protective Order. Persons authorized under paragraph 5 hereof also may take such notes as may be necessary. Such notes shall be treated as Designated Confidential Information.

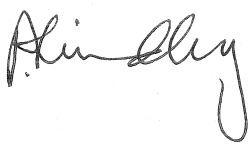
7. The restrictions upon, and obligations accruing to, persons who become subject to the terms of this Protective Order shall not apply to any Designated Confidential Information submitted in accordance with this Protective Order if the Authority rules, after reasonable notice to the applicant or provider and an opportunity for hearing, that such Designated Confidential Information was publicly known at the time it was furnished or has since become publicly known.

8. Where reference to Designated Confidential Information is required in any Authority document, such reference shall be by citation of title or attachment number only or by some other non-confidential description to the extent possible.

9. Designated Confidential Information furnished to the Authority pursuant to this Protective Order shall remain in the possession of the Authority, under seal, and subject to the terms of this Protective Order, until the Authority or a court of competent jurisdiction shall otherwise order.

10. The terms of this Protective Order may be modified on motion of any person or on the Authority's own motion upon reasonable prior notice to the applicant or provider and an opportunity for hearing.

BY ORDER OF THE CONNECTME AUTHORITY



_____

Phillip Lindley, Executive Director

ATTACHMENT A [Non-Disclosure Agreement]

Appendix C - Template for Non-Disclosure Agreement

NON-DISCLOSURE AGREEMENT

THIS AGREEMENT is made this _____ day of _____, 20___, by and between _____, a _____ having a principal place of business at _____ ("PROVIDER") and ConnectME Authority, a body corporate and politic and a public instrumentality of the State of Maine established pursuant to 35-A M.R.S.A. § 9203 (the "AUTHORITY") and James W. Sewall Company, a corporation organized under the laws of the State of Maine and having a principal place of business at 136 Center Street, Old Town, Maine 04419 ("SEWALL") (AUTHORITY and SEWALL individually or collectively referred to as "RECIPIENTS") (PROVIDER AND RECIPIENTS collectively referred to as the "Parties").

Recitals

WHEREAS, the National Telecommunications and Information Administration (the "NTIA") of the United States Department of Commerce has been charged by Congress under the America Recovery and Reinvestment Act of 2009 (the "ARRA") and the Broadband Data Improvement Act (the "BDIA") to develop and maintain a comprehensive, interactive, and searchable nationwide inventory map of existing broadband service capability and availability in the United States that depicts the geographic extent to which broadband service is deployed and available from a commercial or public provider throughout each state (the "Data"); and

WHEREAS, the AUTHORITY is responsible for developing and maintaining the Data for the State of Maine and for serving as a conduit for the Data to the NTIA; and

WHEREAS, SEWALL is contracted by the AUTHORITY to undertake the initial mapping and to consult with the AUTHORITY on how best to update and maintain the Data going forward; and

WHEREAS, the PROVIDER has trade secrets and commercial or financial information relating to the location, type, and technical specifications of infrastructure owned, leased, or used by PROVIDER, which is included in the Data (the "PROVIDER Information"); and

WHEREAS, the PROVIDER has agreed to provide PROVIDER Information to SEWALL and/or the AUTHORITY pursuant to the requirements of the ARRA and the BDIA for use by the NTIA.

NOW THEREFORE, for and in consideration of the mutual promises and covenants contained herein, and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Parties agree as follows:

1. As requested in writing by PROVIDER, RECIPIENTS agree to hold in absolute and strict confidence and shall not disclose or reveal in any manner or form to any entity other than the NTIA any PROVIDER Information identified as confidential that identifies (i) the location, type, and technical specifications of infrastructure owned, leased, or used by PROVIDER or (ii) explicitly identifies PROVIDER in relation to its specific service area or at a specific service location (collectively, the "Confidential Information"), whether such disclosure was made orally, in writing, or in any other form, without prior written permission from PROVIDER.

Notwithstanding the foregoing, Confidential Information shall not include the following:

(a) information that now is or hereinafter becomes publicly known or available otherwise than through unauthorized disclosure by RECIPIENTS;
(b) information that was in RECIPIENTS' possession at the time of disclosure and was not acquired, directly or indirectly, from PROVIDER;
(c) information that RECIPIENTS received in good faith from a third party who is not under a similar restriction of confidentiality and having a right to disclose the Confidential Information; or
(d) information that is required to be disclosed pursuant to applicable law or judicial or administrative action or proceeding, including the Freedom of Information Act requirements.

2. RECIPIENTS agree not to use for any purpose the Confidential Information except as provided for under the ARRA and the BDIA, without prior written permission from PROVIDER.

3. This Agreement shall be governed by the laws of the State of Maine and applicable federal law, except for the State of Maine's conflict-of-laws provisions, as applicable. The Parties to this Agreement each specifically consent to jurisdiction in Maine in connection with any dispute between the Parties arising out of this Agreement or pertaining to the subject matter hereof, with venue being in a court of competent jurisdiction located in Penobscot or Kennebec County, Maine, United States of America.

4. This Agreement shall inure to the benefit of and be binding on the Parties and their respective successors and assigns.

5. This Agreement constitutes the complete and exclusive agreement of the Parties hereto with respect to the matters set forth herein. The terms of this Agreement may not be modified or amended except by an instrument in writing signed by each of the Parties hereto.

6. This Agreement shall be construed without regard to any presumption or other rule requiring construction against the drafting Party.

7. This Agreement may be executed in counterparts and each Party hereto may execute each such counterpart, each of which when executed and delivered shall be deemed to be an original and both of which counterparts taken together shall constitute but one and

the same instrument. This Agreement shall become binding when all counterparts taken together shall have been executed and delivered by all Parties. Execution and delivery of this Agreement may be made by facsimile transmission, and each Party agrees that the delivery of the Agreement by facsimile shall have the same force and effect as delivery of original signatures and that each Party may use such facsimile signatures as evidence of the execution and delivery of the Agreement by all Parties to the same extent that an original signature could be used.

IN WITNESS WHEREOF, the Parties have executed this Agreement the day and year first above written.

WITNESSED BY:

PROVIDER

_____ By: _____

Title: _____

ConnectME Authority

_____ By: _____

Title: _____

James W. Sewall Company

_____ By: _____

Title: _____

Appendix D - White Paper: Maine-SBDD Census Block-Street Segment Misalignment

Misalignment between Census Blocks & Maine E911 Streets

Technical Whitepaper

30 September 2011

Introduction

Importing broadband service provider data into the State Broadband Data Development (SBDD) Map Data Transfer Model at the census block versus street segment level has created challenges for the grantees. For the State of Maine one of the challenges involves the spatial misalignment between the Census Block polygon geometries and Maine's street centerline dataset.

In order to better understand the challenge that Maine is encountering it is necessary to review how the State is collecting and maintaining broadband service provider data.

As a result of Maine's geographic population distribution, mapping broadband service at a census block level does not satisfy the State's requirements for statewide broadband tracking and development. Instead of utilizing the hybrid census block-street centerline model outlined in the SBDD NOFA, the State is collecting service provider coverages at a street level for wired and fixed wired technologies. The State has developed a relational model to best represent the one-to-many relationship between a street segment and its broadband service provider coverages.

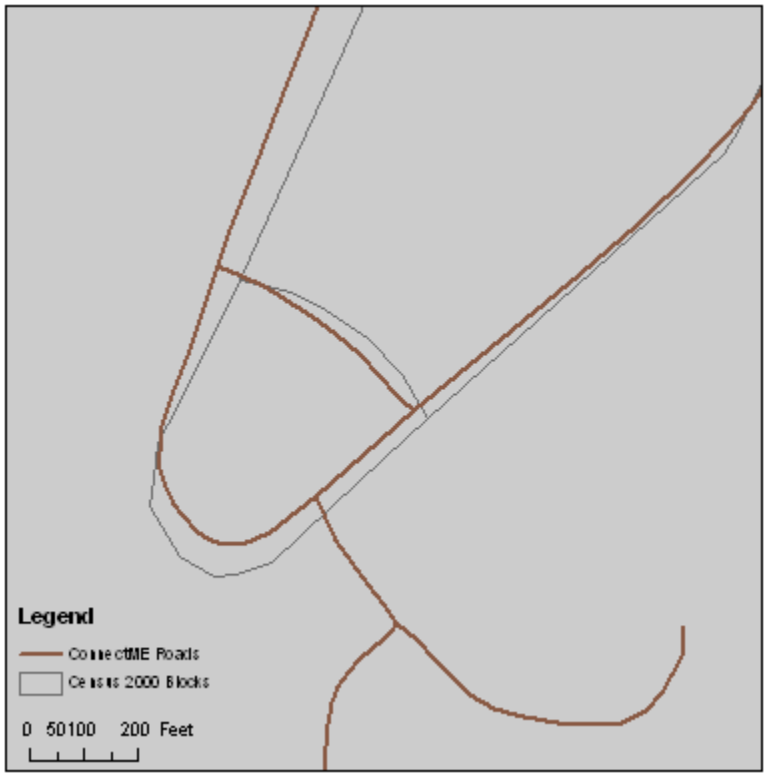
The street segment data that the State is utilizing is based primarily on the State's E911 street centerline GIS layer with additional street coverage added from a 3rd party dataset for those towns not yet participating in the E911 project. For information on the broadband service providers, a database table was developed based on the required attribution descriptions outlined in the NOFA.

With the data structure in place the challenge of importing this data into the transfer model can be discussed along with the State's proposed solution to minimize its impact of the misalignment on the broadband data processing.

The Challenge

Census Block geometry is spatially misaligned with the Maine's street centerlines.

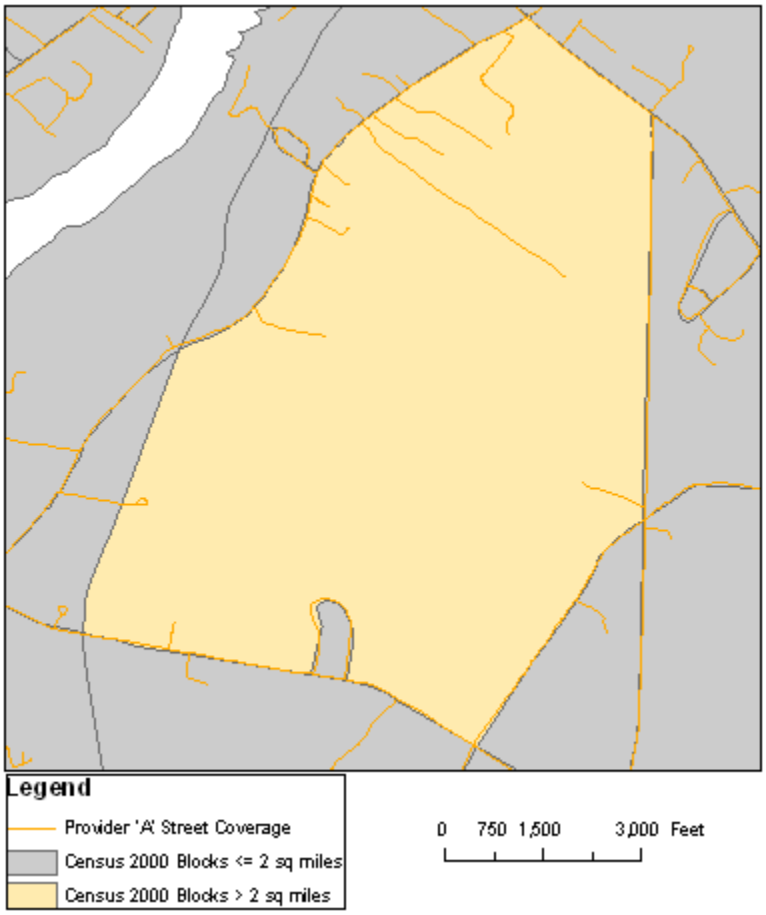
Examples described herein reference 2000 Census Block data and reflect examples found in both 2000 and 2010 Census Block datasets.



As shown in the above screen capture the typical misalignment between these two datasets is between 50 and 100 feet.

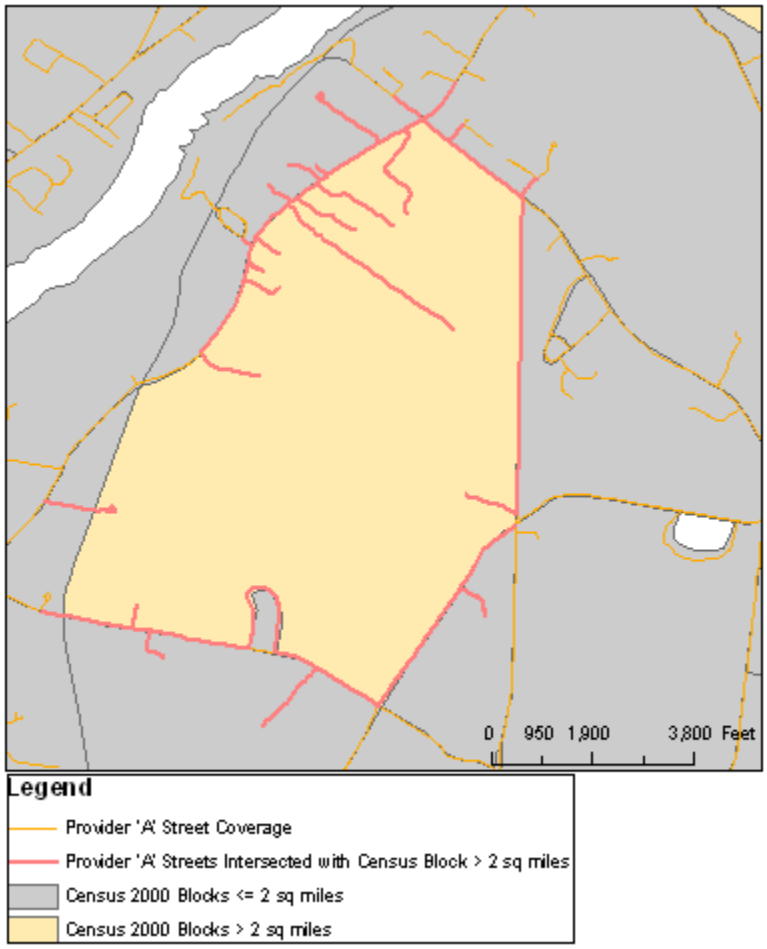
Since Maine is storing all broadband service providers' information as records associated with street centerlines this misalignment causes considerable challenges when trying to accurately export this information into the new SBDD data transfer model. The misalignment is great enough that utilizing basic intersect methodology is not enough to provide NTIA with a highly accurate representation of broadband coverage in Maine.

Example: Basic Intersect



The above screen capture shows an example of a 2000 Census Block that is greater than 2 square miles and Provider ‘A’ street coverage data that is to be reported.

Performing an intersect between the greater than 2 square mile census block and the street network for Provider ‘A’ results in the highlighted streets being reported.

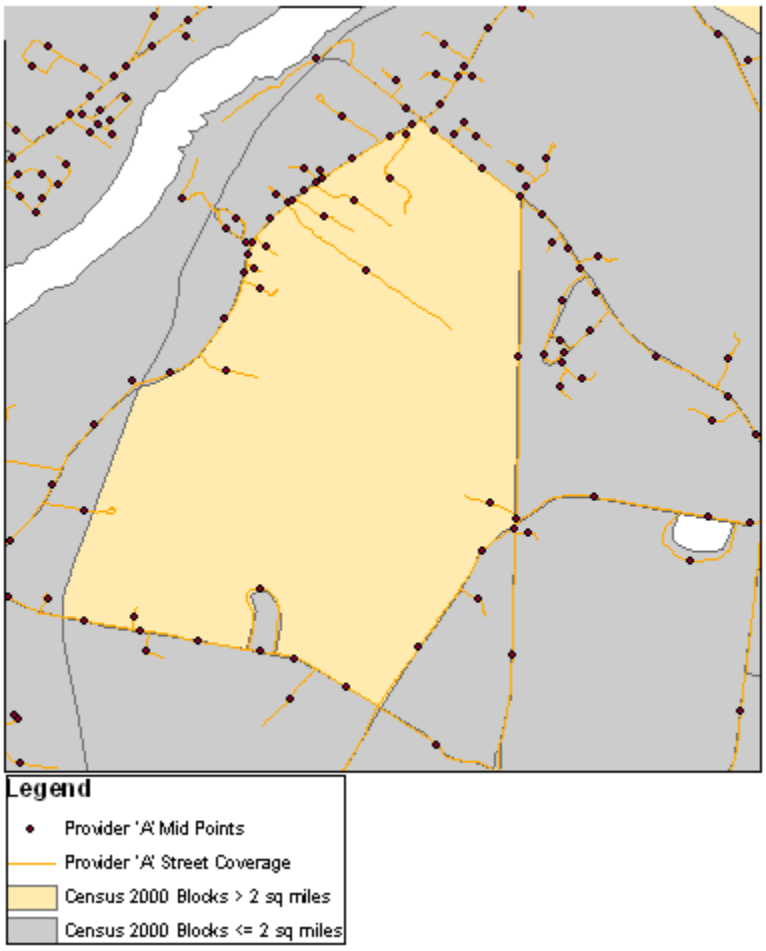


It is clear from the screen capture that several extra streets where selected and a few streets were missed by using the intersection method.

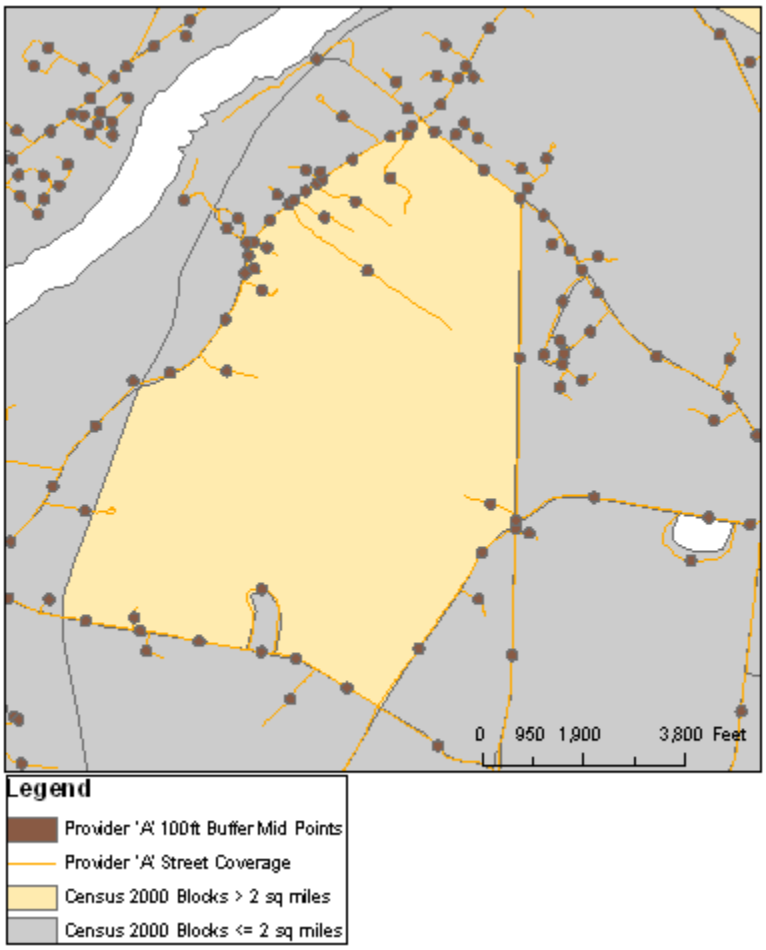
Proposed Technical Solution

The solution to this challenge is a multi-step process that needs to be run on each street segment with intelligent analysis employed to minimize errant representation of broadband service in census blocks greater that 2 square miles.

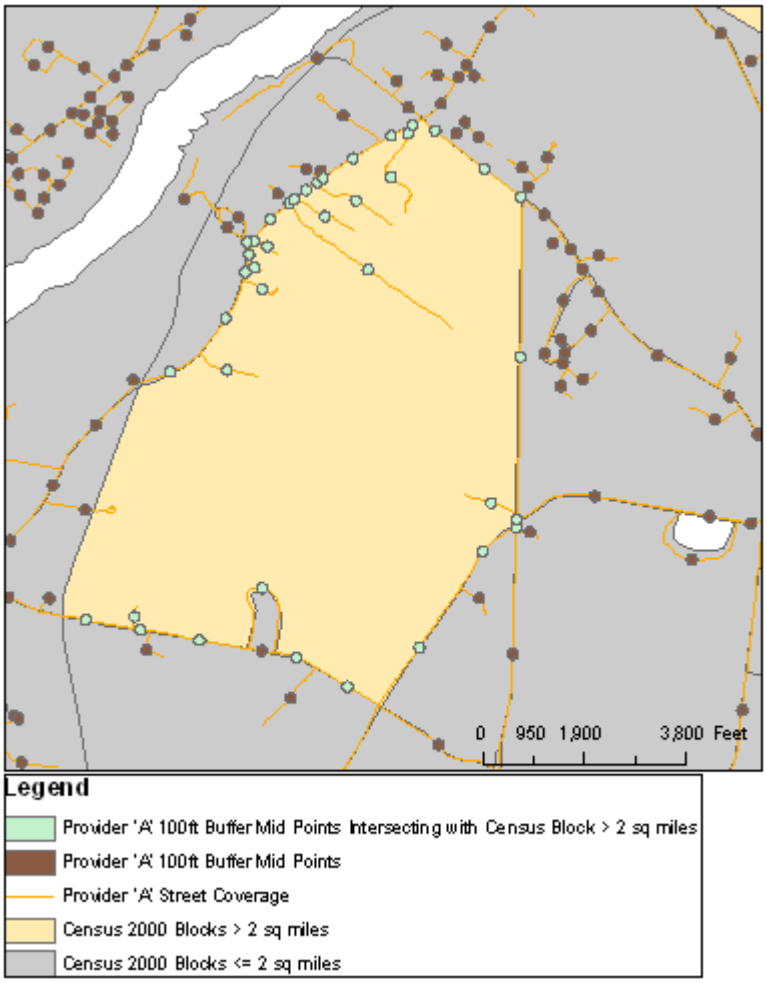
The first step is to create mid points of the street centerlines for Provider ‘A’.



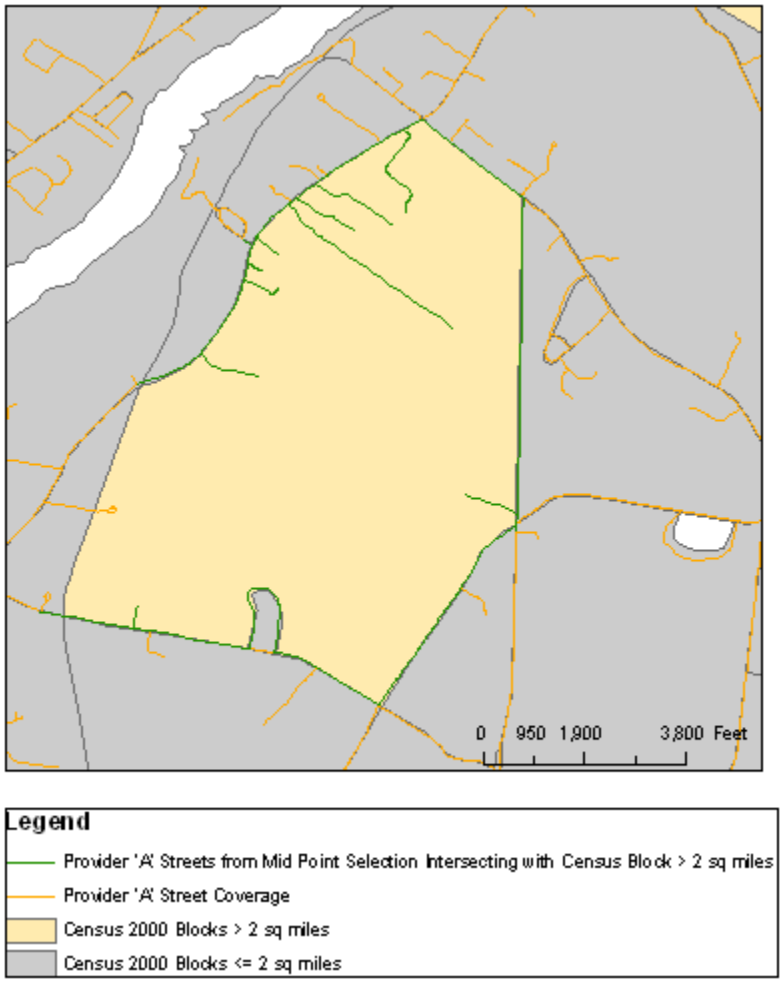
The next step is to create a buffer around the mid points using a distance to compensate for the misalignment in the census blocks. The distance found to have the best return for this process was determined to be 100 feet.



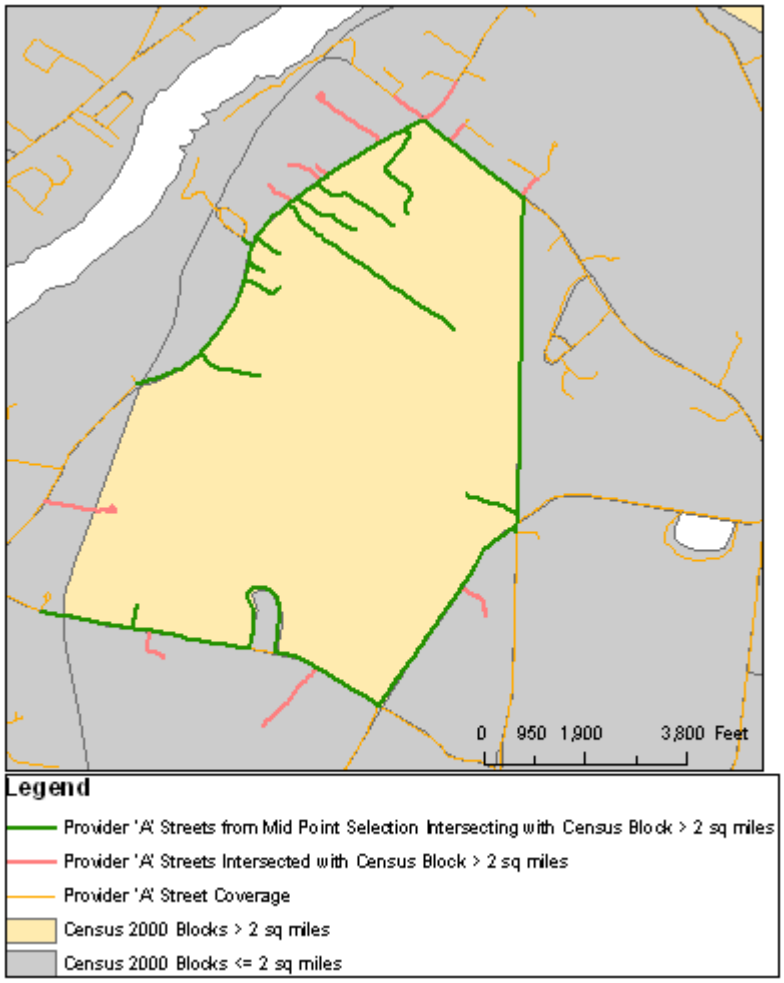
Selecting the buffered mid points that intersect the greater than 2 square miles census block returns the following results:



The selected buffered mid points relate back to the following street selection:

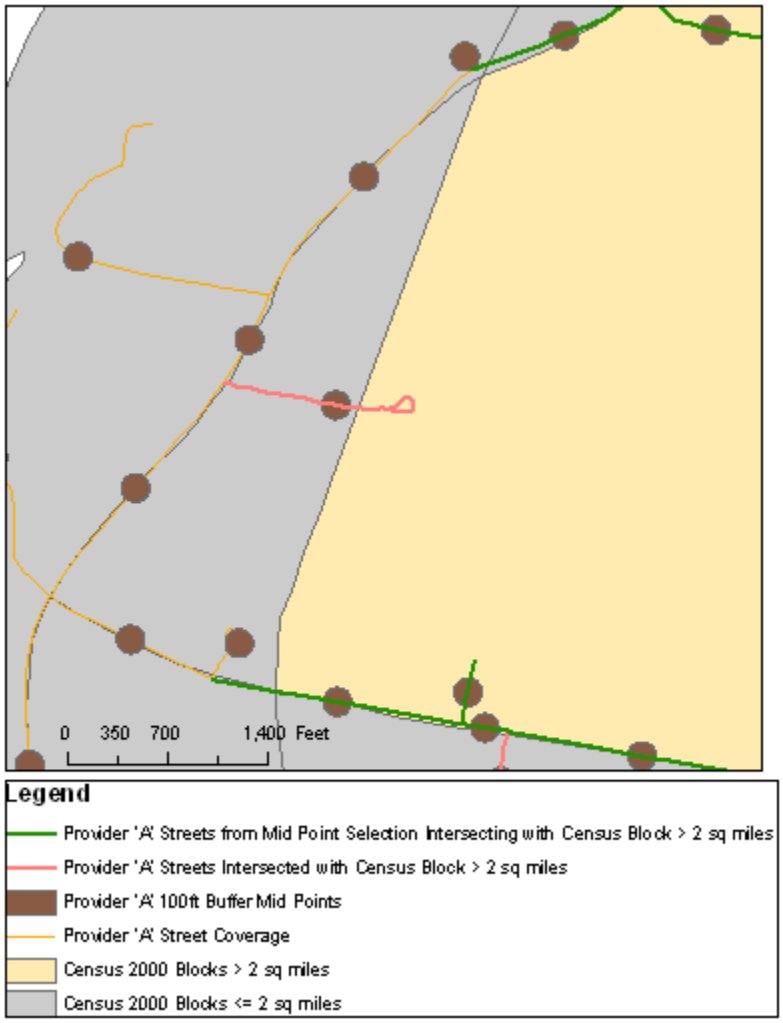


Compare this selection to the original intersection process selection:



The result of the mid point buffering process is a much better representation of streets contained within the greater than 2 square miles census block. A large number of the erroneous streets initially marked as included in the census block have been dropped providing a much improved report.

Taking a look at the left hand side of the map there is a street that intersects the census block but is not reported in the mid point buffering process. A closer look reveals why.

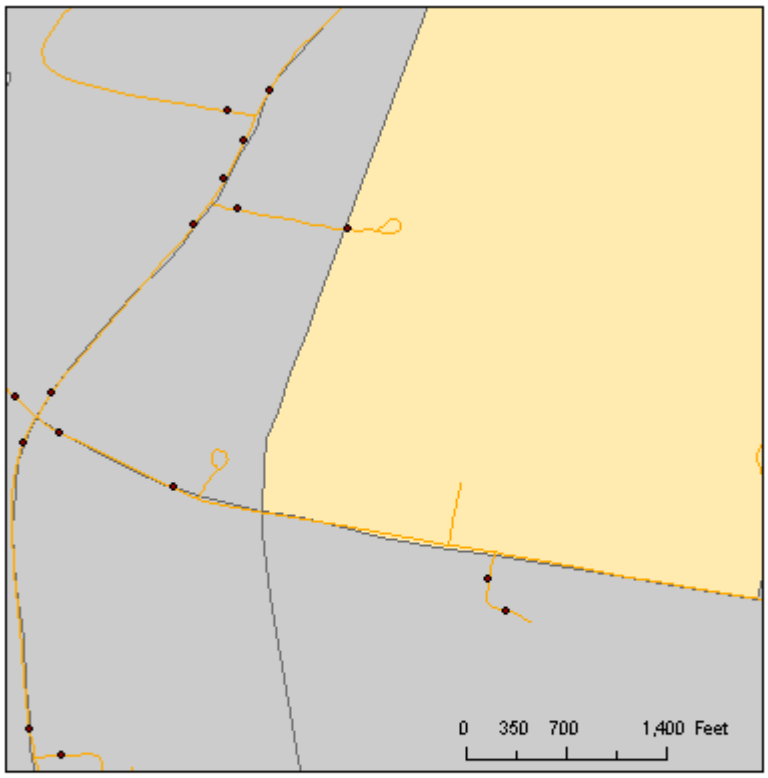


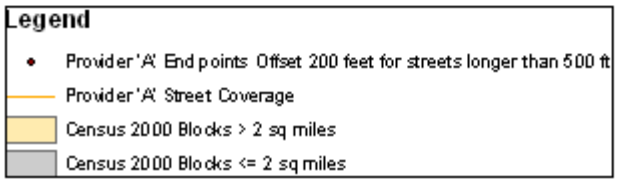
The street in question is relatively long in length and has a midpoint that is located outside of the greater than 2 square miles census block resulting in it not being reported.

Building onto what has been performed already an additional automation check can locate and incorporate these long streets into the dataset.

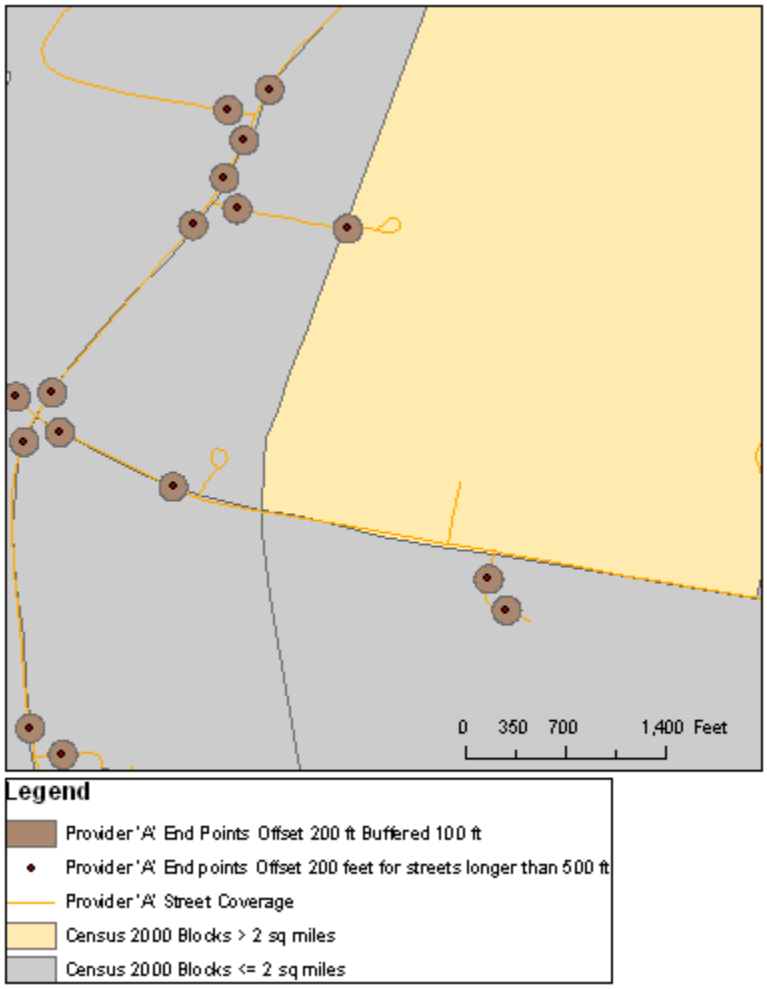
The Proposed Solution: Additional Intelligence

The first step in this additional iteration is to select streets that have not been flagged as being contained within a census block greater than 2 square miles and are longer than 500 feet. Then create points that are offset 200 feet from each end of the selected streets.

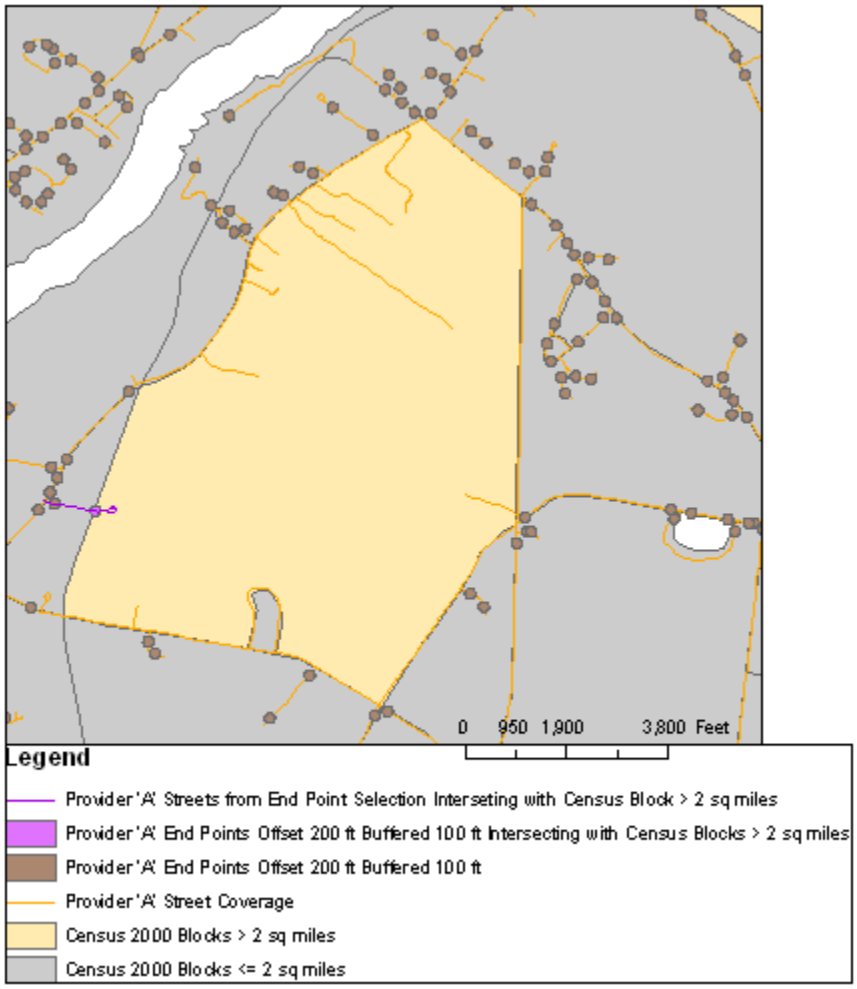




Next these 200 feet offset points are buffered 100 feet:

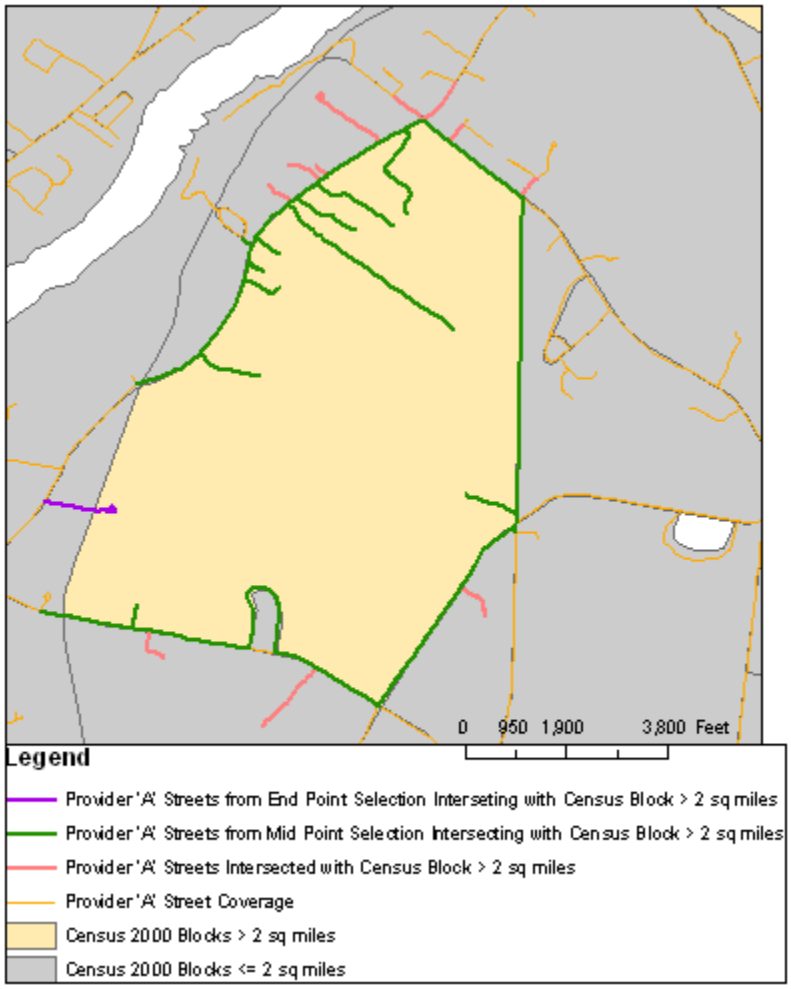


Then by selecting the buffers that intersect the greater than 2 square miles census block and selecting the associated streets, the process results in the following:



The Results

The screen capture below shows the streets reported using the two step process in comparison to the basic intersect method of reporting street segments.



The following table shows the results of the processes for Provider 'A' for this particular census block:

Method	Missed Streets	Extra Streets	%Error
Basic Intersect Process	2	11	35.14
MID Point Process	1	2	8.11
MID and END Point Process	0	2	5.41

The proposed solution gives a much better representation of the data set and minimizes the errors induced by using a basic intersection process.

Summary

The SBDD data submission requirements involving census blocks and street segments have created a challenge for the grantees to accurately represent broadband service provider information. In particular the State of Maine has a significant offset between the 2010 Census Block geometries and the corresponding street centerlines that the State is utilizing to map broadband availability data. A basic spatial intersect method has proven to be highly inaccurate in identifying street centerline data in census blocks greater than 2 square miles.

Through analysis the State has found that using a two step process using mid-point and offset end point buffering provides improved results for street centerlines in the greater than 2 square mile census blocks. The State expects this methodology to improve the accuracy of street segment determination by approximately 50% for these regions. Unless instructed otherwise by the NTIA project team, the State intends to utilize this two step process to develop the SBDD deliverables for street centerlines in census blocks greater than 2 square miles.

Appendix E – Residential Survey Letter

State of Maine Internet Service Questionnaire

This survey is PREPAID to return to the State of Maine! It is only 10 questions long and will take less than 2 minutes to complete. The information is confidential. The data will only be used for the purpose of verifying where high speed internet is and is not offered across the State of Maine. More information about this initiative is provided at the end of the survey.

Thank you in advance for you participation.

If you have access to the internet and wish to complete this survey electronically, you may do so at:
http://www.surveymonkey.com/s/JBLNRHX

1. Please enter your physical home address if it is different than your mailing address:
   Street Address _____
   City _____ State _____ Zip Code _____

2. Do you currently subscribe to internet service? Yes No
   If No, please proceed to Question 7, otherwise continue to question 3.

3. What form of internet service do you purchase?
   a. Dialup Service b. DSL or Higher Wired Service c. High Speed Cable
   d. Satellite e. Fixed Antennae Wireless
   f. Mobile Wireless (Mobile Laptop Card, Smartphone, or similar device)

4. Who is your internet service provider?_____

5. Does this provider meet the level of advertised internet speed for the plan you subscribe?
   Yes No I Don't Know

6. Have you ever purchased internet service from a different provider at this address? Yes No
   If YES, please list the name of the previous provider(s)?_____

7. If you do not currently have internet service, have you attempted, in the past, to acquire service at this address but were unable to locate a providing company? Yes No N/A

8. In the past, has an internet provider tested access to the internet at this address? Yes No I Don't Know
   If YES, please list the name of the service provider?_____

9. Was the internet connection test successful? Yes No I Don't Know N/A

10. If you do not subscribe to high speed internet, but it IS available, what is the reason you do not subscribe?
    a. No interest b. Price of service c. Limitations of the service
    d. Need a different option to fit my internet hardware needs e. N/A
    f. Other _____

Thank you for taking the time to help shape the future development of broadband service in Maine!

Please fold the survey so the prepaid return label is on the outside and drop it into the nearest mailbox.

More Information about this initiative…
In 2007, the Maine State Legislature created the ConnectME Authority with the mission to promote the development of high speed internet communications systems in the un-served and underserved regions of the state. To fulfill this mission we are seeking your assistance in providing valuable information about the availability and use of high speed internet, otherwise known as broadband, at your location.

The ConnectME Authority has established a website where you can perform a test of internet speed for your location. If you are interested in running a test of your internet speed, please visit http://connectmespeedtest.maine.gov and follow the instructions provided. Access to this site does require a device capable of running flash applications such as a laptop or desktop computer. The test tool is not currently supported by smart phone devices.

To learn more about this project please visit our websites:
http://www.maine.gov/connectme/mapping/BroadbandMappingProject.htm
http://www.sewall.com/projects/project_connectme.php

Appendix F – Mobile Provider Feedback Letter

Welcome Mobile Providers!
Thank you for your participation in the State of Maine's Broadband Mapping Project. As part of our contract/delivery to the National Telecomunications and Information Administration (NTIA) and to the State of Maine we are initiating mobile coverage verification feedback. In your geoportal account you will find two maps of your company's coverage area in Maine.

How did we come up with these maps?
Each time we receive a coverage shapefile from a mobile provider we first overlay the current coverage with the previous round's coverage to find changes in the service area. When an area has a change of service we place a point at a road intersection, based on the E911 roads layer, within the new coverage. Field crews visit each of the points and perform an internet speed test using a mobile aircard from that specific carrier. All point data is analyzed back at the office to determine whether the test point qualifies as having reached broadband speeds. These points are then projected on to maps and the data is extrapolated based on a Thiessen Model to show the internet speed coverages. Two different National Standards are presented: FCC Standards and NTIA Standards.

FCC Standards
FCC Standards break internet speeds into categories called "Tiers"
First Generation
First Generation speed is defined as between 200kbps to 768kbps, symmetrical. This means both upload and download need to be between 200 and 768 to qualify. Any speed (upload or download) less than 200kbps qualifies as "Less than First Generation" regardless of the reciprocating speed (e.g., if you have an upload speed of 120kbps and a download speed of 706kbps the category is still "Less than First Generation" because both speeds were not equal to or greater than 200kbps.

Tier 1
Tier 1 speed is defined as between 768.1kbps to 1.5Mbps, symmetrical. This means both upload and download need to be between 768.1kbps and 1.5Mbps to qualify. Any speed (upload or download) less than 768.1kbps qualifies as "First Generation" regardless of the reciprocating speed (e.g., if you have an upload speed of 767kbps and a download speed of 1.3Mbps the category is still "First Generation" because both speeds were not equal to or greater than 768.1kbps.

Tier 2
Tier 2 speed is defined as between 1.51Mbps to 3Mbps, symmetrical. This means both upload and download need to be between 1.51kbps and 3Mbps to qualify. Any speed (upload or download) less than 1.51kbps qualifies as "Tier 1" regardless of the reciprocating speed (e.g., if you have an upload speed of 1.4Mbps and a download speed of 2.78Mbps the category is still "Tier 1" because both speeds were not equal to or greater than 1.51Mbps.

NTIA Standards

Broadband service is defined as a minimum of 200kbps upload and 768kbps download. Both speeds, upload and download, have to reach 200kbps and 768kbps respectively or they do not qualify as broadband. (e.g.,if you have an upload speed of 240kbps and a download of 766kbps, the speed test does not qualify as broadband). If a speed test reached broadband speed in only the upload or the download, but not both, then the speed test was deemed as "Inconsistent Broadband". If neither upload nor download reached broadband speeds the speed test was deemed "No Broadband". If the speed test could not be performed because of a lack of internet service completely then the test was deemed "No Connect".

In the future we will be working with individual mobile providers regarding discrepancies in coverage based on our verification findings. We welcome any questions or feedback you may have regarding this project. Thank you again for your participation and look forward to working with you in the future.

Sincerely,

Sewall Broadband Mapping Team

OFFICIAL APRIL 2013 UPDATE SUBMISSION TO THE NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION UNDER THE STATE BROADBAND INITIATIVE GRANT PROGRAM FOR THE STATE OF MICHIGAN

CONNECT Michigan®

April 1, 2013

TABLE OF CONTENTS

April 1, 2013

Ms. Anne W. Neville
SBI Grant Program Director
National Telecommunications and Information Administration
U.S. Department of Commerce
Room 4716
1401 Constitution Avenue, NW
Washington, DC 20230

Dear Ms. Neville:

As the State Broadband Designated Entity, in partnership with Michigan Public Service Commission, please accept this submission from Connected Nation on behalf of the state of Michigan's State Broadband Initiative (SBI) Grant Program, known as Connect Michigan.

Connected Nation and Connect Michigan congratulate the National Telecommunications and Information Administration (NTIA) and the Federal Communications Commission (FCC) on achieving the two-year anniversary of the National Broadband Map. Truly, now more than ever, the significance of complete and validated data through this effort is impacting lives in communities all across our great country. The Connect Michigan program and its collective stakeholder community continue to be faithful and energized contributors, and we are proud to play such a part in forging the innovation economy of the twenty-first century.

The artifacts that comprise this submission should be found to be compliant with the April 1, 2013, deadline for the semi-annual data update and in accordance with the terms of the July 1, 2009, Notice of Funds Availability (NOFA) and all subsequent clarifications pertaining to delivery of state-level mapping of broadband service availability. This packet includes:

Inventory of Deliverables, Connect Michigan: April 1, 2013

NOFA Requirement	Data Transfer Model	Data Description
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in Census Blocks of No Greater Than Two Square Miles in Area
Appendix A: 1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census Blocks Larger in Area Than Two Square Miles

Appendix A: 1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address
Appendix A: 3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points
Appendix A: 4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing
Appendix A: 4	n/a	Community Anchor Institutions-Narratives
VII.A.1(a)	n/a	Accuracy and Verification Report
n/a	DataPackage.xlsx	Worksheets of Contact Information, Record Count, and Provider Summary Table
n/a	n/a	List of Changes and Corrections to the Dataset
n/a	n/a	Non-Participating Provider (NPP) Narratives
n/a	n/a	Broadband Provider Roster and Participation Status

In addition, this data update submission should be found to be compliant with the additional program requirements instituted by the National Telecommunications and Information Administration since the time of the October 2012 SBI data submission for the Connect Michigan program. Specifically, these new requirements are:

SBI Data Transfer Model

The submission of the broadband dataset for April 1, 2013, is contained within the SBI Data Transfer Model as released on the Grantee Workspace on December 14, 2012. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information on each provider as possible.

Additional Submission Guidance

On February 8, 2013, NTIA released new guidance regarding the processing of wireless data, for both fixed and mobile broadband providers. All wireless provider coverage records have been reviewed and are in compliance with this grantee guidance for this April 2013 submission period. Even providers that did not have an update for this submission cycle were reviewed and data reprocessed as necessary for those records that were not yet in compliance with the new guidance.

This submission continues to follow the speed technology guidance released by the Program Office on August 9, 2012, to review speed tier codes in correspondence with technology of transmission codes. In the October 2012 submission, descriptions were provided in the methodology paper that offered an explanation for any submitted technology of transmission and speed combinations that were outside of the expected value range. That practice continues in this submission as technology and speed combinations are reviewed and scrutinized; any questionable information supplied by providers is reviewed more in

depth with the provider to ensure the information is accurately captured or a proper explanation is provided as to why the speed information should be submitted as supplied even if it falls outside the expected value range.

This submission also includes a narrative describing the data and coverage estimation of a non-participating provider. While Connect Michigan continues outreach to all providers prior to each submission period, the need to submit broadband service data for all providers regardless of their participation is evident as the SBI program continues into this seventh round of data submissions. The submission of this estimated broadband service area for providers that have not supplied data to Connect Michigan is essential in being able to portray a more accurate depiction of the current broadband landscape.

This April 2013 semi-annual data update under the SBI Grant Program continues to demonstrate our dedication to implementing the joint purposes of the Recovery Act and the Broadband Data Improvement Act (BDIA) by gathering comprehensive and accurate state-level broadband mapping data, developing state-level broadband maps, aiding in the development and maintenance of the National Broadband Map, and undertaking statewide initiatives for broadband planning.

Broadband Service Availability — Provider Outreach and Verification

This data update submission under the SBI program includes datasets for 93.57 percent of the Michigan provider community, or 131 of 140 total providers. There are 129 participating providers and 2 additional non-participating providers whose estimated coverage areas have been submitted. Of the 129 participating providers, 48 supplied an update to their network or coverage area(s), while 54 have reported no change. The remaining 27 represent providers who previously supplied data but were non-responsive in the April 2013 update effort; therefore, their previous dataset is being put forward as part of this compilation. A complete roster by provider depicting participation status and contact history is contained herein. The remaining 9 providers that are not represented in the attached datasets were non-responsive to multiple contact attempts.

In addition to the facilities-based and middle-mile broadband providers tracked above, this submission contains datasets for 4 resellers that were able to provide sufficient information on their service area(s) to be included in the data transfer model.

As the aforementioned roster and attached methodology documentation will attest, it is the collective opinion of the Connect Michigan principals that all commercially reasonable efforts were made to account for 100 percent of the known Michigan broadband provider community, pursuant to this semi-annual data update submission.

Connect Michigan has also continued to perform broadband verification activities through several means. In addition to confirmation of service area(s) by each provider, Connect Michigan conducts field validation efforts. To date, 104 (74.29 percent) providers have been validated through field verification activities. Additional details on verification activities are contained within the Field Validation Methodology.

The Connect Michigan website (www.connectmi.org) continues to serve a prominent role in the outreach and data collection effort. This program asset provides a way for the general public to

participate in the process by offering interactive tools for users to test their connection speed, submit broadband inquiries, or contact a program representative.

As an indicator of stakeholder penetration, the Connect Michigan website encountered 7,714 unique visits during this reporting period (45,416 total to date for the life of the grant awarded on December 20, 2009. Additionally, this pronounced Web activity netted 41broadband inquiries over this same reporting period (1,518 grant inception to date). The website also provides access to the My ConnectView™ interactive mapping application, which allows consumers and broadband providers to confirm or dispute the coverage represented on the broadband inventory map. These consumer-initiated actions are facilitated through the Connect Michigan website and the Connect Michigan interactive mapping tool (My ConnectView™) that offer the stakeholders the vehicles to provide information regarding availability in their respective service area, either in affirmation or contest of the reported data represented in the Connect Michigan mapping artifacts. Since the initial data collection and release of corresponding maps, feedback in the form of broadband inquiries has allowed Connect Michigan to identify additional areas that are in need of field validation, which is scheduled as soon as possible.

Community Anchor Institutions

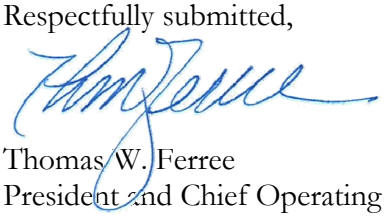
Connect Michigan continues to make significant inroads to gather data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. This uptick in CAI data collection was further supported by NTIA's outreach to grantees reiterating the importance of this outreach. With the continued commitment of the Michigan Public Service Commission, we have continued to focus on a relationship-oriented approach with state-level agencies and organizations that generates more responses than general contact.

In conjunction with the Michigan Public Service Commission, outreach was conducted during this data update reporting period by Connect Michigan to continue identification of existing, centralized sources for CAI connectivity data. Additionally, outreach was coordinated to distribute the CAI survey to institutions throughout the state through multiple methods including a customized online survey available on the Connect Michigan website. Building on past success of the September 2012 Education Campaign, February 2013 was recognized as Public Safety Month where the public safety sector was the focus of CAI data collection, research, and public affairs outreach. Connect Michigan has developed a number of new relationships with statewide associations, such as the Center for Educational Performance and Information, to promote the importance of broadband connectivity at anchor institutions and participation in this data collection process. The value of these relationships continues to impact the entire success of the Grant Program, and the CAI engagement is a logical extension of new and existing relationships. Connect Michigan will continue to build upon these new relationships over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

From our work in Michigan, as well as other states, we recognize the great value of this data to future collaboration efforts within the state as well as its value to the National Broadband Map. We plan to continue to bring best practices to the Connect Michigan efforts, along with an investment of both human and technical resources required to reach our goal of increasing the data that is secured and reported as part of this process.

The Connect Michigan program exists to improve data on the deployment and adoption of broadband services and to assist in the extension of broadband technology across all regions of the great state of Michigan, as well as the United States and its territories through contribution to the National Broadband Map. We look forward to the continuing work ahead and improving upon our data collection methods.

Respectfully submitted,



Thomas W. Ferree
President and Chief Operating Officer
Connected Nation, Inc.

MICHIGAN COMMUNITY ANCHOR INSTITUTIONS METHODOLOGY

In this seventh reporting period of the SBI, Connected Michigan, working in close coordination with the state of Michigan, has established an ongoing mechanism for gathering data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. Since the October 2012 data submission, the CAI outreach process method has been modified to improve data collection. Specifically, the outreach process is a more focused sector-specific and relationship-oriented approach that generates more responses than general contact.

Connected Michigan has continued to identify and process CAI data obtained through an ongoing statewide outreach campaign. Physical address information continues to be augmented through manual sourcing and geocoded by Connected Michigan through Esri ArcGIS software.

Connected Michigan continues to utilize a customized online survey hosted through SurveyMonkey, with a landing page on the Connected Michigan website that was developed during the first reporting period. This survey, in combination with a customized data-gathering spreadsheet, was distributed on a regular basis to a targeted list of CAI throughout the state as well as organizations and agencies that work closely with the CAI. The distributions were completed with the support of the state client. Connected Michigan will continue to use these data-gathering tools for future targeted outreach efforts throughout the coming months leading up to the next reporting period. These materials are customized to fit the CAI categories as defined in the SBI NOFA.

The survey can be accessed at this link: http://www.surveymonkey.com/s/RTWDM66

In addition to the survey, Connected Michigan has developed a number of new relationships with statewide associations such as the Center for Educational Performance and Information, to promote the importance of broadband connectivity at Community Anchor Institutions and participation in this data collection process. It is apparent that these relationships are beneficial to the entire success of the grant program, and the CAI engagement is a logical extension of new and existing relationships. Connected Michigan will continue to build upon these new relationships over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

In addition to fostering and building relationships with state agencies, associations, and organizations, Connected Michigan has also developed a sector-specific calendar that supports CAI outreach as well as research and communications efforts. This focused approach allows a corporate commitment to capturing CAI data in addition to developing meaningful sector-specific content. Since the October 2012 submission, the sector-specific approach included a month-long public safety campaign in February 2013. During this campaign, Connected Michigan committed to improve relationships with key stakeholders, distribute survey requests to sector representatives, and provide sector-specific education through communications and webinar resources. Outreach to and survey of hospitals, local law enforcement, and fire stations helps build awareness and establishes a centralized database of key connectivity data for planning.

Connected Michigan conducts significant research as part of an ongoing process to identify existing, centralized sources for CAI connectivity data. In tandem with these efforts to identify existing data, Connected Michigan continues to identify key CAI contacts in an effort to distribute and promote the online survey and raise awareness of the importance of CAI broadband connectivity. Also, when possible, Connected Michigan works with the Michigan Public Service Commission, to identify existing relationships that can support CAI outreach.

Connected Michigan has an ongoing mission to educate CAI throughout the state on the importance of participating in the project. Participation by these institutions will raise awareness about the importance of broadband connectivity and the need to report the requested data for inclusion on the National Broadband Map.

The greatest challenge with collecting CAI data continues to be educating the CAI about the Connected Michigan project as well as self-awareness of their own broadband connectivity (specifically upload and download speeds). Connected Michigan will continue to research key CAI organizations and agency contacts in an effort to raise awareness of this project among CAI. When applicable, the Michigan Public Service Commission will continue to be briefed on the current CAI data and provided information so it can assist with outreach and promotion within the state.

A CAI summary of all processed and submitted data is provided below:

CAI Type	Total	Physical Address	Lat/Long	Technology of Transmission	Download Speed	Upload Speed
K-12 Schools	4648	4648	4644	362	333	334
Libraries	2287	2287	2274	893	896	39
Healthcare	259	259	258	3	3	3
Public Safety	1000	1000	987	20	18	18
Higher Ed Institutions	308	308	301	37	36	36
Other Government	34	34	34	17	15	15
Other Non-Government	423	423	423	7	6	6
Total	8959	8959	8921	1339	1307	451

During the coming months, CAI data collection will be supported by regular reporting to the Connected Michigan team. The CAI data is proving an invaluable resource to all components of the Connected Michigan effort. The data identifies potential local champions, sector trends, and opportunities for improvement as well as opportunities to educate CAI not familiar with their current connectivity.

SBI Data Submission Methodology

The submission of the broadband dataset for April 1, 2013, is contained within the SBI Data Transfer Model and additional components as released on the Grantee Workspace on December 14,

2012. Connected Nation (CN) has reviewed all literature that relates to the release and use of this data transfer model and recognizes that it does not replace or dictate how data is stored, processed, or displayed for the state, as it is meant primarily as a means to transfer the broadband data from all states and territories and populate the National Broadband Map in a seamless fashion.
Connected Nation has complied with the following guidance documents published by NTIA:

- Technical Mapping Guide, as released on the Grantee Workspace on March 24, 2011, was followed to ensure the completeness and validity of the submission through completion steps and checklists, completing the DataPackage spreadsheet, uploading broadband datasets into the Data Transfer Model, and checking the dataset using the SBDD_CheckSubmission receipt process.
- Naming Conventions and Category of End User, as released on the Grantee Workspace on March 26, 2012, was followed to ensure the consistency of individual file and zip package naming.
- Wireless Data Processing Guidance, as sent to SBI grantees on February 8, 2013, was followed to ensure that all fixed and mobile wireless provider coverage records are submitted to NTIA as separate, closed polygons whenever there is a variation in any of the required fields.

In addition to the methodologies contained herein, the Changes and Corrections documentation, as well as the DataPackage.xls containing contact information, the data dictionary, and a provider summary table, the following feature classes are submitted within the SBI Data Transfer Model for the state of Michigan.

Inventory of Deliverables, Connected Michigan: April 1, 2013

NOFA Requirement	Data Transfer Model	Data Description
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in Census Blocks of No Greater Than Two Square Miles in Area.
Appendix A: 1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census Blocks Larger in Area Than Two Square Miles.
Appendix A: 1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address.
Appendix A: 3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points.
Appendix A: 4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing.

The provider data collected by CN on behalf of the state of Michigan have been formatted per the given specifications and uploaded into the appropriate feature classes of the SBI Data Transfer Model. Wireline availability is contained within census blocks and road segments, wireless availability is contained as polygons of coverage areas, and middle-mile connections and Community Anchor

Institutions are contained as point data. All speed data is contained at the census block, road segment, or wireless polygon level of availability. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information as possible.

Connected Nation has continued outreach to satellite providers on their availability, technology, and speed information, but granular coverage is not yet available. Submitted within the wireless feature class are the satellite companies providing service to Michigan as a polygon of the state boundary. Efforts will continue to collect, process, or otherwise create more granular satellite data based on availability analyses and guidance received from NTIA. Process development continues as well to be able to create more granular satellite coverage based on satellite equipment positioning and geographic inputs.

MICHIGAN FIELD VALIDATION METHODOLOGY

CN focused a portion of its time on specific validation processes such as:

- conducting random spectrum analysis studies throughout the state using an Avcom PSA-37-XP spectrum analyzer;
- conducting mobile speed tests throughout the state using an iPhone, Android (or other smart phone) as well as provider-specific aircards (Sprint 3G/4G, Clearwire et al);
- identifying pre-selected, provider-submitted wireless transmit tower sites and cross-referencing data about that tower against the Federal Communications Commission (FCC) databases such as Antenna Structure Registration and/or the Universal Licensing System;
- cross-referencing Federal Registration Number data against available FCC Form 477 data as well as the FCC **CO**mmission **RE**gistration **S**ystem (CORES);
- validating provider submitted data (for example: latitude/longitude) using a handheld Garmin eTrex Summit GPS unit or GPS enabled software such as Microsoft *Streets & Trips*;
- locating physical wire-line attributes (such as Central Offices, Remote Terminals, CATV plant, etc.) and comparing them against provider submitted data; and
- conducting on-net and off-net speed tests using the FCC portal at http://www.broadband.gov/qualitytest/about/ or using the Ookla Net Metrics enabled speed test utility located on each of CN's program specific websites.

Additionally, CN cross-referenced numerous public documents in order to ensure that all known broadband providers were located and contacted. This included searching membership logs from trade associations (WISPA, WCAI, PCIA, etc.), the Cable Television Fact Book, Public Utility Commission records, Public Service Commission records, Chamber of Commerce, etc.

To date, Connected Nation's staff has conducted on-site validation tests in Michigan on the following providers: 2020 Communications LLC (d.b.a. 123 Net); 2125 Cable Company LLC (d.b.a. Sunrise Communications LLC); ACD Net; Ace Telephone Company of Michigan Inc. (d.b.a. Peninsula Telephone Company); Agri-Valley Communications Inc.(d.b.a. Pigeon Telephone Company); Air Advantage (d.b.a. Bigtube Wireless, Great Lakes Internet, and Internet 123.net); AIRGRANT; Allendale Telephone Company; AT&T; Azulstar Inc.; Banyon Online Services LLC;

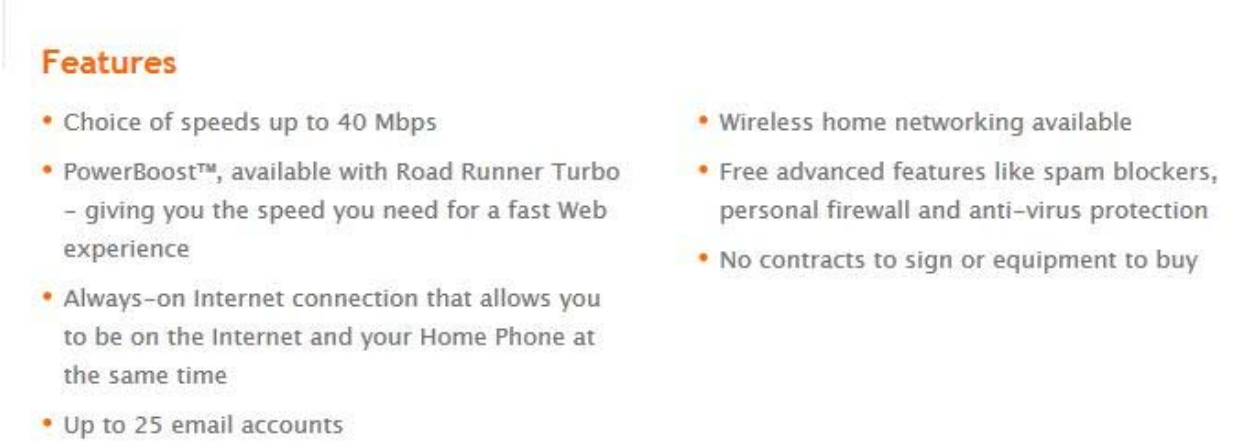
Baraga Telephone; Barry County Telephone; Bitwise Wireless; Bloomingdale Communications Inc.; Boardman River Communications LLC; Cable America Michigan LLC; Camp Communication Services Inc.; Carr Communications; CenturyLink; Charter Communications; Cherry Capital Connection LLC; Clearwire Corporation; CMS Internet LLC (d.b.a. CSI.net); COLI Inc.; Comcast Cable Communications LLC; Crystal Automation Systems Inc. (d.b.a. Casair); Custom Software Inc.; D&P Communications Inc.; Daystarr Communications LLC; DMCI Broadband LLC; Dreamscape Communications; Drenthe Telephone Company; Endless Journey Inc.; Farmer's Mutual Telephone; Fourway Computer Products Inc. (d.b.a. Fourway.net); FreedomNet Solutions; Frontier Communications Corporation; Great Lakes Comnet Inc. (also d.b.a. Westphalia Telephone Company and Clinton County Telephone); Great Lakes High Speed; Hiawatha Telephone (d.b.a. Jamdots and Chippewa Valley Telephone); Hidden Lake Wireless Inc.; I-2000 Inc.; Interlink Computers Technology Inc.; Invisalink Wireless Enterprises LLC; Iron Bay Computer and Design; ISP Management; KEPS Technologies Inc. (d.b.a. ACD.Net); LakeNet LLC; Leap Wireless International Inc.; Lennon Telephone; Level 3 Communications; Lighthouse Computers; M3 Wireless; M33 Access; Martell Cable Services Inc.; Mercury Network Corporation; Merit Network; MetaLINK Technologies Inc.; MetroPCS Wireless Inc.; Michigan Cable Partners; Michwave Technologies Inc.; Microtech Services Inc.; Mutual Data Services; NCATS; Network Computers LLC.; Nodin Communications; Ogden Communications Inc.; Packerland Broadband; Parish Communications; Pasty.Net Inc.; Peninsula Fiber Network LLC; Reliable Internet; Rural Communications Inc.; Sister Lakes Cable TV; Skyweb Network Inc.; Small Business Solutions Group (d.b.a. RuralReach.com); SMR Communications Inc. (d.b.a. Michiana Supernet); SpeedNet LLC; Springcom Inc.; Sprint Nextel Corporation; T2 Communications LLC; TC3Net; TDS Telecommunications Corporation; The ISERV Company; Time Warner Cable; T-Mobile; Town & Country CATV; Tri-County Wireless Inc.; Tucker Communications Inc.; Upper Peninsula Telephone (d.b.a. LIPC and Alphacomm.net); Verizon North Inc.; Vision Quest Technology Solutions; Vogtmann Engineering; Waldron Telephone Company; West Michigan Broadband; Wide Open West (d.b.a. Broadstripe); Windstream Communications (d.b.a. PAETEC Communications, Talk America); Winn Telephone Company; Wireless Technology Solutions; Wyandotte Municipal Services; Xyotek; Zayo Bandwidth LLC; and Zing Networks Inc.

In addition to the field verification tests that have been conducted, Connected Nation has also conducted work in the field to collect information for the non-participating provider, Wireless Technology Solutions, which, by nature of the methodology required for this collection, is also included in the above list.

From program initiation through this reporting period, CN has completed field validation testing against 104 companies (out of a universe of 140 viable providers) totaling 74.29 percent within the state of Michigan. This percentage also considers the non-participating provider record submitted to NTIA as may be contained herein (see "Data Submission and Coverage Estimation of Non-Participating Provider" below).

CN has also continued to review provider datasets for accurate speed information, platform listings, and other intricacies that may fall outside of the standard SBI Data Transfer Model parameters, as published on the NTIA Grantee Workspace on December 14, 2012. Any providers whose submitted coverage and attributes are anticipated to come into question have been further reviewed and confirmed; details on a case-by-case basis are presented below.

Bright House Networks, LLC
Issue: Technology of transmission code 40 with maximum advertised download speed in tier 8, lower than expected value range for the technology.
Resolution: Provider website advertises 40 Mbps; screenshot below.



Features

- Choice of speeds up to 40 Mbps
- PowerBoost™, available with Road Runner Turbo – giving you the speed you need for a fast Web experience
- Always-on Internet connection that allows you to be on the Internet and your Home Phone at the same time
- Up to 25 email accounts
- Wireless home networking available
- Free advanced features like spam blockers, personal firewall and anti-virus protection
- No contracts to sign or equipment to buy

DATA SUBMISSION AND COVERAGE ESTIMATION OF NON-PARTICIPATING PROVIDERS (NPP)

As part of its ongoing broadband mapping efforts, CN has developed a series of processes with the goal of submitting coverage estimation mapping data to NTIA for every known and qualifying last-mile broadband provider, regardless of platform type (cable modem, DSL, fixed wireless, etc.). Appendix A presents full reports on the estimated broadband service territory for the providers in this state that have either been non-responsive or that have refused to participate in the SBI mapping initiative as of April 2013. These coverage estimation reports are for non-participating providers whose data has not been previously submitted to NTIA in past mapping cycles.

The section below provides a summary of the status of CN's outreach and findings on all non-participating provider coverage for the April 2013 SBI submission.

Bitwise Wireless, LLC
The coverage estimation for Bitwise Wireless was not updated from the previous submission in October 2012. The full white paper containing the most recent coverage estimation for this provider can be found within the October 2012 submission to NTIA.

Wireless Technology Solutions
Coverage for this NPP is being submitted for the first time; please find a white paper on provider outreach and coverage estimation in Appendix A.

PROVIDER VALIDATION METHODOLOGY

Broadband providers maintain their service area data in many different formats, all in varying levels of complexity and granularity. In order to ensure that the data required by the NTIA is standardized across all providers and that it is as accurate as possible, CN translates and formats the data that providers are able to supply into a GIS shapefile and produces maps for the provider to review. The resulting map(s) and review process allow for providers to see their service area in a geographic format – for some providers, this is the first time they have seen maps of their broadband service area. Having the mapped service area allows providers to quickly identify any issues that appear in the data representation, whether the issue is in the data translation into a GIS format or from the original data collection and submission. Often data is provided from various sources and through the review and revision process, local engineers who operate the networks and work in the field are able to ensure that the tabular data that has been submitted is accurate and represents the real-world network extent. Any issues in how the service area is represented on the map(s) are remedied by CN, whether they are additions, removal of service, or any other revisions. Revised maps of service area representations are sent to the provider for review and approval; CN will revise data and return maps as many times as necessary until the provider is in agreement that the map represents their service area as accurately as possible. Once the review process has been completed and final approval of the data is provided, the data is deemed ready for NTIA submission.

Once the data collection has been aggregated at a statewide level, static maps of statewide and county-level availability are produced and made publicly available. In addition, consumers can visit the interactive online tool, My ConnectView, to create customized views of broadband service areas and analyze corresponding demographic information. Leveraging broadband service data on various platforms allows for public users, providers, and other stakeholders to review, scrutinize, and provide feedback on the represented data. This feedback becomes a validation method in itself, as consumers submit inquiries to CN either affirming where service is not available or identifying areas where broadband service is shown on the map, but in actuality is not available. This allows for a follow-up to providers regarding revisions to the data as it is represented; it also allows for CN to identify locations where on-site visits may be necessary to complete field validation of available services. Public feedback on all forms of mapping products serves as a localized validation method for provider-supplied information and allows CN to resolve inaccuracies as they are identified to ensure that only the highest quality information is provided to stakeholders.

Additionally, non-participating provider narratives that were submitted in previous mapping cycles are subjected to the same level of scrutiny. Occasionally, a provider may elect to voluntarily participate (thus eliminating the need for future data estimation activities in the field). However, more often than not, the NPP narrative is updated with a combination of data gleaned from the provider's website, data obtained through FCC research and/or data collected/verified in the field by a CN staff engineer.

Estimates derived from provider-validated data indicate that approximately 0.99 percent of Michigan households do not have terrestrial fixed broadband service available, and approximately 0.10 percent of Michigan households have neither mobile nor fixed broadband service available.

Within rural areas of the state, results derived from provider-validated data indicate that approximately 1.67 percent of rural Michigan households do not have terrestrial fixed broadband

service available, and approximately 0.16 percent of rural Michigan households have neither mobile nor fixed broadband service available. Please note that the availability estimates presented are based on Census 2010 household information.

The estimates above, in accordance with NTIA's definition of available broadband service as specified in the SBI NOFA, include broadband service with download speeds of at least 768 Kbps and upload speeds greater than 200 Kbps.

In addition, due to the nature of the SBI data collection methodology as defined by the NTIA and based on both census block geographic units and street segment data, the estimates of broadband availability derived from provider-validated data may include an overstatement of the actual number of households with broadband availability. Under the census block-based data collection method, a provider will typically report broadband availability for an entire census block whether its network is present across the whole or only a subset of that census block. This potential overestimation at the census block level can be amplified as the data is aggregated across the entire state.

WIRELESS METHODOLOGY

Broadband Service Availability in Provider's Service Area
Wireless Services Not Provided to a Specific Address

Data solicited from a fixed wireless provider to create propagation models include, but are not limited to:

1. The name of the structure.
2. Whether the transmitting device is operational or proposed.
3. The maximum advertised downstream speed, the maximum advertised upstream speed.
4. The typical downstream speed, the typical upstream speed (peak periods for both).
5. The frequency range of spectrum being used (as prescribed by NTIA). This may include (but is not limited to) spectrum authorizations identified within the Federal Communications Commission (FCC) Universal Licensing System (ULS) database or located on the FCC's Spectrum Dashboard. This research often proves to be exceptionally effective when estimating the coverage area of an NPP.
6. The primary population center(s) being served (for geopolitical boundary reference).
7. The physical address of the transmit site (in the event latitude/longitude is unavailable from the provider this allows a quick reference point for geocoding).
8. Latitude in either Degrees, Minutes, and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
9. Longitude in either Degrees, Minutes and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
10. Antenna pattern (e.g. omnidirectional, 180°, 120°, 90°, etc.).
11. Azimuth of antenna (e.g. 360° with magnetic declination if known).
12. Approximate transmit radius (in feet, miles, or kilometers).

13. Polarity of transmit antenna (Vertical or Horizontal).
14. Transmit antenna gain (in dBi).
15. Line loss (applicable only to providers using coax, heliax, waveguide or other forms of cabling – excludes power-over-Ethernet devices).
16. Mechanical and/or Electrical beam tilt (if applicable).
17. Equipment Manufacturer (allows easy cross-reference against manufacturer's specification sheet).
18. Power output of the transmitting device (if unknown, FCC standards or manufacturer specifications are applied).
19. AMSL at base of tower site.
20. Antenna centerline AGL (height of antenna above ground level measured at the centerline of the actual antenna).
21. Foliage factors (Evergreens/Deciduous and percent of ground cover).
22. Ground Clutter (primarily used in rural areas to account for foliage and in metropolitan areas to account for types and heights of buildings if known).
23. Average gain of receive antenna.
24. Receive antenna is estimated at height above average terrain (HAAT) of 6.2 meters/20 feet.
25. Federal Registration Numbers (if applicable) which may allow opportunities to cross-reference and/or obtain additional data from the FCC's ULS and the **CO**mmission **RE**gistration **S**ystem.

Propagation modeling combines scientific data and empirical mathematical formulation for the characterization of radio wave propagation as a function of frequency, distance, and other conditions. Propagation software(s) typically use the Irregular Terrain Model (also known as Longley-Rice) of radio propagation for frequencies between 20 MHz and 20 GHz. This model is based on electromagnetic theory and statistical analyses of the combination of terrain features and radio measurements, then predicting the median attenuation of a radio signal as a function of distance and the variability of the signal in time and in space. For metropolitan areas, the software can typically be adjusted to use the Okumura-Hata model, which accounts for predicting the behavior of cellular transmissions in areas where buildings are the primary obstructions. The resulting product from either model depicts a graphical illustration of the theoretical propagation characteristics of a selected frequency range based on defined variables (receiver sensitivity of the home/mobile device, foliage factor, and digital elevation terrain input).

After converting propagation models into a geospatial format, additional processing is completed to remove the small pixels representing service present in the resulting dataset. These areas are initially created based on the parameters entered in the software from the provider equipment information, the underlying data parameters of elevation, hill shade, etc., and the limitations of the software itself to display a broadband service area as accurately as possible. Generally, these random pixel striations appear as a result of signal levels reaching the highest elevated points within the prescribed radius. Typically, while this pixilation anomaly shows legitimate areas where signals can be received, these highly elevated points may have exceedingly sparse populations or are entirely void of population. As a result, and congruent to the *Wireless Technology Methodologies and Business Logic* white paper

submitted to NTIA on January 20, 2011, all independent pixels representing service that are less than 0.125 square miles in area have been removed from the geospatial representation of each wireless provider.

BROADBAND INQUIRIES METHODOLOGY

CN collects consumer feedback in the form of broadband inquiries (BBIs). These inquiries represent any type of communication received from the public regarding broadband service. Once BBIs are received across the state, this information is overlaid with the broadband availability information which was collected through the SBI program. This allows for a real-world comparison of the broadband landscape to the information received from broadband inquiries. Consumers submitting these inbound comments and/or inquiries are able to provide information regarding five categories: 1) residents who do not have broadband but want it; 2) residents who have broadband but want a different provider; 3) residents who do not have broadband, but the broadband inventory maps indicate that they do; 4) residents who have broadband but want a faster connection speed; and 5) residents who have broadband but want a less expensive service option.

BBIs are submitted frequently by consumers via the Connected Michigan website. Inquiries often seek help to identify local broadband provider options, or to learn when a specific provider may be able to provide service to that consumer. Consumer comments also provide information which may help modify maps with actual service area information. The primary objectives of CN regarding these inquiries are 1) to improve the accuracy of the state maps with submitted consumer information and follow-up field research; 2) to provide broadband options to consumers through cooperation with mapped providers and by facilitating new broadband service options; and 3) to map and analyze information from consumers about areas of unmet broadband demand and alternatives to currently mapped services. A prime example of the second option is the utilization of the Rural Utility Service satellite eligibility tool. By simply entering the consumer's address, the CN engineer can quickly determine if the consumer meets the initial qualification status for BIP satellite subsidies.

New BBIs are assigned to either the GIS department or the Engineering & Technical Services (ETS) team depending on the category entered by the consumer on the website submission form. The GIS or ETS team members respond to each inquiry according to the information entered by the consumer. Many BBIs can be resolved through desktop research; however, if a BBI requires research in the field, the assigned ETS team member conducts such research when performing field validations in the area of the inquiry, or at another such time as is practical and appropriate. GIS and ETS team members respond to and conclude BBIs via telephone contact and/or e-mail communication.

The broadband inquiry process has been implemented in each of the CN state programs with successful results. Altogether CN has received over 18,839 broadband inquiries since 2007, allowing the state programs to evaluate each inquiry for broadband demand and data verification. These inquiries are continuously examined against current broadband availability, updated every six months, to determine if previously unserved households have been expanded to and can now receive broadband at their residence. This database of broadband inquiries has also allowed the CN

state programs to aggregate demand in concentrated areas to show providers the exact locations where the population has made it clear that they would purchase broadband if it was made available to them. Providers in the states have responded to this process and have expanded to areas knowing that their investment will be worthwhile. Data verification methods have also proven successful, as the state programs have been able to show those inquiries that indicate the broadband service areas are misrepresented on the map to providers, who then verify where service cannot reach in regard to that residence(s). The broadband coverage in these states has been altered to create a more accurate map based on the inquiries submitted by the public.

During this reporting period, the Connected Michigan project has received a total of 41 inquiries (1,518 grant inception to date). As more inquiries are submitted to Connected Michigan, a more thorough validation of the broadband landscape can be performed, while also allowing providers to see which areas have a high demand for broadband adoption.

MY CONNECTVIEW METHODOLOGY

My ConnectView is an interactive online mapping tool for viewing, analyzing, and validating broadband data. Developed using Esri's ArcGIS for Server and Adobe's Flex Framework and hosted and maintained by Connected Nation, My ConnectView is a multi-functional, user-friendly way for local leaders, policymakers, consumers, and technology providers to devise a plan for the expansion and adoption of broadband.

First and foremost, My ConnectView allows consumers to locate their residence and identify providers that offer broadband Internet service to that location. The interactive platform allows for users to build and evaluate broadband expansion scenarios using a wealth of data, including several coverage analysis layers, speed analyses, Community Anchor Institutions, and tools to search and export household demographic information, as well as extract data in GIS, spreadsheet, and/or PDF formats.

My ConnectView also features more interactive data layers and additional tools than ever before to allow the consumer to explore the broadband data. My ConnectView provides consumers with the ability to print, e-mail, and provide feedback on the broadband data displayed on the interactive map. Through the collection of this feedback, a visual demand for broadband is presented. This visualization allows the CN state programs the ability to validate the broadband availability for accuracy. If residents within a region state they are without broadband, but the interactive map shows otherwise, this allows CN to approach the providers within that area in an effort to trim down their coverage to more accurately represent real-world availability on the ground.

The Connected Michigan project launched My ConnectView on April 2, 2012, and has received 3,317 visits this reporting period; to date the interactive mapping application has received 14,617 visits.

SPEED TEST METHODOLOGY

The 3,557 speed tests that are represented in the Connected Michigan Speed Test Report during this reporting period (22,084 grant inception to date) are the result of a partnership between CN and Ookla Net Metrics. Utilizing this relationship increases the level of confidence in the data being collected and provides for a far greater sample size than could be collected by a single testing site.

Ookla owns and operates Speedtest.net, as well as develops and deploys speed tests, such as the Connected Michigan speed test website, for partners around the world. This network of sites that is developed and run on its testing technology provides Ookla with a vast dataset that, due to the variability of geographic information collected across the varying speed test sites, is geocoded utilizing Geo-IP technology. This technology allows for tests to be geocoded to points of aggregation, typically larger nodes across provider networks. While there are hundreds of thousands of tests that have been conducted, the level of aggregation is only sufficient for county-level detail due to the test results being located at these larger nodes and not at an absolute location for each speed test.

In an effort to validate broadband data from the Connected Michigan project, speed test information is collected throughout the state. Speed tests provide speed information on the path taken through all networks (a provider's network as well as additional networks) a local machine must connect to in order to reach the host test. The benefit of this collection of speed information is two-tiered. First, it allows for a comprehensive dataset of speeds, while also providing Connected Michigan with the information on where broadband services are available. Second, unlike theoretical speed information which may be received through the data collection process, the use of speed tests provide real-world information on the speeds that currently exist within the state of Michigan.

PROVIDERS DEEMED NON-VIABLE

The following list of companies represents the remainder of the broadband provider universe that was originally identified as complete for outreach to begin for the State Broadband Initiative. These providers are not included in the Data Package for the April 2013 submission because they have been deemed non-eligible under the parameters and guidance of the SBI grant program. This list of companies includes, but is not limited to: providers offering service but below the current definition of broadband, those that have gone out of business, technology consulting firms, infrastructure or network construction companies, non-facilities based general resellers, etc.

	Company Name	URL	Comments
1	20/20 Communications, LLC	n/a	Company has been sold to another area WISP.
2	21Globe, Inc.	n/a	Company is no longer in business.

3	650Net	http://www.650net.net/	This company provides dial-up only in Michigan.
4	A 007 Access	n/a	Acquired by another company.
5	Aaccess Network Communications	n/a	Not a broadband provider.
6	Access123.net	http://www.access123.net/	Not a broadband provider.
7	ACERX.NET	n/a	Not a broadband provider.
8	Airbaud, Inc.	http://www.airbaud.net/	No longer a fixed wireless provider in Michigan.
9	Airespring, Inc.	http://www.airespring.com	Nonfacilities-based reseller.
10	Airewaves Broadband, LLC	n/a	Company is no longer in business.
11	Airmail247.com	n/a	Company is no longer in business.
12	All-In-One Wireless, Inc.	n/a	No longer in business; acquired by another company.
13	Antioch Wireless Broadband	www.antiochwirelessbroadband.com/	Not a broadband provider.
14	Arrowheadnet.com	http://www.arrowheadnet.com/	Not a broadband provider.
15	bargainisp.net	http://www.bargainisp.net/	Not a broadband provider.
16	Bayville Wireless	n/a	Company is no longer in business.
17	Beanstalk Internet	n/a	Company is no longer in business.
18	Beaver Island Broadband, Inc.	n/a	Not a broadband provider.
19	BlazeConnect, Inc.	n/a	Company is no longer in business.

20	Blue Communications, LLC	http://www.bluecommunicationsllc.com	Not a broadband provider.
21	Broadband National	http://www.broadbandnational.com	Nonfacilities-based reseller.
22	Broadview Networks Holdings, Inc.	http://www.broadviewnet.com	Not a Michigan provider.
23	BullsEye Telecom, Inc.	http://bullseyetelecom.com	Nonfacilities-based reseller.
24	Cable Vision, Inc.	n/a	Company is no longer in business.
25	Cablemax Communications	n/a	Company is no longer in business.
26	CAC MediaNet, Inc.	n/a	Not a broadband provider.
27	Camino-Net Internet Services	http://www.camino-net.com	This company provides dial-up only in Michigan.
28	Caspian Community TV Corporation	n/a	Not a broadband provider.
29	CCIS.net	http://www.ccis.net	Not a Michigan provider.
30	Celito Communications	http://www.celito.net/	Nonfacilities-based reseller.
31	CIMCO Communications, Inc.	n/a	This company is not a broadband provider.
32	City of Crystal Falls	http://www.crystalfalls.org/Electric%20Department.htm	This company is not a broadband provider.
33	Clear Rate Communications, Inc.	http://clearrate.com/	This company provides dial-up only in Michigan.
34	Cleartouch.Com	n/a	Company is no longer in business.
35	CMC Telecom, Inc.	http://cmctelecom.net	Nonfacilities-based reseller.
36	Deltaforce	http://www.deltaforce.net	Nonfacilities-based reseller.

37	deluxehost.com	http://deluxe-host.com	This company is not a broadband provider.
38	DGUI	n/a	Company is no longer in business.
39	Dial National	n/a	Company is no longer in business.
40	Dialer.net	http://www.dialer.net	Nonfacilities-based reseller of mobile 3G services.
41	DIECA Communications, Inc.	http://www.covad.com/	Company has been acquired by another company.
42	DSTech	http://www.dstech.us/	They only provide wireless hotspots for the City of Escanaba and are not a fixed wireless provider.
43	DTS-NET.COM	http://www.dts-net.com/	Nonfacilities-based reseller.
44	Dundee Internet Services, Inc.	n/a	Company is no longer in business.
45	Eagles Internet Services	n/a	Company is no longer in business.
46	Enventis Telecom Inc.	http://www.enventis.com	Company does not provide broadband services in Michigan.
47	ETI - Connecting Your World	http://www.cyberenet.net/	Nonfacilities-based reseller.
48	Fast Dependable Access	n/a	Company is no longer in business.
49	First Communications, LLC	www.firstcomm.com	Company has been non-responsive.
50	Global Crossing Telecommunications, Inc.	http://www.globalcrossing.com/	Acquired by another company.
51	Grid4 Communications, Inc.	http://www.grid4.com	Nonfacilities-based reseller; company has refused to participate.
52	Holland Board of Public Works	http://www.hollandbpw.com	This company is not a broadband provider.
53	Hubwest Protected Networks LLC	http://www.hubwest.com	Company does not provide broadband services in Michigan.

54	Imbris, Inc.	http://www.imbris.com	Company does not provide broadband services in Michigan.
55	IMGISP.NET	http://www.imgisp.net/	This company is not a broadband provider.
56	Incredible Networks	n/a	Company is no longer in business.
57	Industrial Grade Broadband, LLC	n/a	This company is not a broadband provider.
58	Inercom Communications Inc.	http://www.inercom.com	Company is no longer in business.
59	Interactiveinfo.com Inc.	http://www.rocketbroadband.com	Company does not provide broadband services in Michigan.
60	International Broadband Electric Communications, Inc.	http://ibec.net	This company is not a broadband provider.
61	Intouch Internet Services, Inc.	http://www.intouchmi.com	Nonfacilities-based reseller.
62	iRadical	n/a	Company is no longer in business.
63	ISG	http://www.leapfrogbroadband.com	This company is not a broadband provider.
64	ISPartner.net	n/a	Company is no longer in business.
65	ITWifi, Inc.	http://www.fnw.us/	Company has been sold to another area WISP.
66	Jackpine Internet	http://www.jackpine.com	Nonfacilities-based reseller.
67	Jenco Speed Web	http://www.jencospeed.net	Company does not provide broadband services in Michigan.
68	LARIAT.NET	http://www.lariat.net/	Company does not provide broadband services in Michigan.
69	LCSisp.com	http://www.lcsisp.com/index.cfm	This company provides dial-up only in Michigan.
70	Lightyear Network Solutions, LLC	http://lightyear.net	Nonfacilities-based reseller.

71	LinkAmerica.Net	n/a	Company is no longer in business.
72	Local Exchange Networks of Michigan, Inc.	n/a	Company is no longer in business.
73	M55 WiFi Wireless Internet Service	http://www.m55wifi.net/	No longer in business.
74	MainBoard, LLC	http://www.mainboard.cc/internet.htm	Company does not provide broadband services in Michigan.
75	Maine Cable and Wireless	n/a	Company is no longer in business.
76	Maple River Networks, LLC	n/a	Company is no longer in business.
77	Marcin Company	n/a	Company is no longer in business.
78	MediaNet	n/a	Company is no longer in business.
79	Metropolitan Telecommunications Holding Company	http://www.mettel.net	Non-facilities based reseller.
80	Mich1 Internet, Inc.	http://www.mich1.net	Nonfacilities-based reseller.
81	Michiana Wireless, Inc.	http://www.michianawireless.com	Company does not provide broadband services in Michigan.
82	Michigan Department of Information Technology	http://www.michigan.gov/dit/	This company is not a broadband provider.
83	Microwave Communications, Inc.	n/a	This company is not a broadband provider.
84	Midwest Communications Services, Inc.	http://mwcomm.com	This company is not a broadband provider.
85	Midwest Energy Cooperative	http://teammidwest.com/	No longer a broadband provider.
86	Millenicom Inc.	http://www.millenicom.com	Oregon-based reseller of mobile broadband plans.
87	MIMesh	http://www.mimesh.com	This company is not a broadband provider.

88	Nanomega.Com	n/a	Company is no longer in business.
89	NetAccess, Inc.	http://www.nas.net/	This company is not a broadband provider.
90	NetSpeed Online	n/a	Company is no longer in business.
91	New Edge Network, Inc.	www.newedgenetworks.com	Acquired by another company.
92	Nextlink Wireless, Inc.	n/a	Company does not provide broadband services in Michigan.
93	Northern Michigan Online	http://www.nmo.net	This company is not a broadband provider.
94	Northwest ISP	www.northwestisp.com/	Company is no longer in business.
95	NSIGHTTEL WIRELESS, LLC	www.nsighttel.com	Company does not provide broadband services in Michigan.
96	Overarch Broadband	www.overarch.com	Company does not provide broadband services in Michigan.
97	Pacific Internet Exchange	n/a	Company does not provide broadband services in Michigan.
98	PAETEC Communications, Inc.	http://www.paetec.com/	Acquired by another company.
99	Paknet Limited	n/a	This company is not a broadband provider.
100	Planet Online	www.planetonline.net/	This company is not a broadband provider.
101	PremoWeb	n/a	This company is not a broadband provider.
102	Raser, Inc.	http://www.wmis.net/	Company has been non-responsive.
103	Renaissance Networks	www.renaissancenetworks.com/	This company is not a broadband provider.
104	Rural Communications, Inc.	http://www.ruralcommunications.net/	No longer in business.

105	Saturn Telecommunication Services, Inc.	n/a	Acquired by another company.
106	Seneca Communications	www.senecacommunications.com	This company is not a broadband provider.
107	Simply Dialup A Metrogeek Company	www.simplydialup.com/	This company is not a broadband provider.
108	Sling Broadband	www.slingbroadband.com/	Company does not provide broadband services in Michigan.
109	Star Video	n/a	Company is no longer in business.
110	State of Michigan	n/a	Not a broadband provider.
111	StoneBridge Wireless Broadband	n/a	Acquired by another company.
112	Surferz.Net	www.surferz.net/	This company is not a broadband provider.
113	T1 Shopper	www.t1shopper.com	Non-facilities based reseller.
114	Talk America Inc.	n/a	Acquired by another company.
115	Telefonica USA, Inc.	www.telefonica.com/	Company does not provide broadband services in Michigan.
116	TelNet Worldwide, Inc.	www.telnetww.com	Company has been non-responsive.
117	Telovations, Inc.	www.telovations.com	Company does not provide broadband services in Michigan.
118	Thumbnet	n/a	Acquired by another company.
119	Total Access Networks, Inc.	n/a	Not a broadband provider.
120	TRANSWORLD NETWORK, CORP	n/a	Not a broadband provider.
121	True Connections, LLC	n/a	Company is no longer in business.

122	TSISP.NET	n/a	Company is no longer in business.
123	TVC Inc.	www.tvcinc.com	Not a broadband provider.
124	University Corporation for Advanced Internet Development	n/a	Not a broadband provider.
125	UNUM Telecommunications, Inc.	n/a	Company does not provide broadband services in Michigan.
126	WilTel Communications, LLC	n/a	Acquired by another company.
127	WingsComm Communications	n/a	Company is no longer in business.
128	Wireless First LLC	n/a	Acquired by another company.
129	Wireless Roanoke, Inc.	n/a	Company is no longer in business.
130	Wireless Ypsi	www.wireless.ypsi.com	Company provides free hotspots in Ypsilanti area.
131	wisbin	www.wisbin.com/	Company does not provide broadband services in Michigan.
132	www.AmericanAngel.us	www.AmericanAngel.us	Company is no longer in business.
133	YEYZOO.NET	www.yeyzoo.net/	Not a broadband provider.
134	YLISP (Your Local ISP)	www.itsyournet.com	Not a broadband provider.
135	YourT1Wifi.com	www.yourt1wifi.com/	Company does not provide broadband services in Michigan.
136	Z-Comm, LLC	n/a	Company is no longer in business.
137	ZOOM Internet Services, LLC	n/a	Acquired by another company.

APPENDIX A: ESTIMATION OF NON-PARTICIPATING PROVIDER

Wireless Technology Solutions

WIRELESS TECHNOLOGY SOLUTIONS

As part of its ongoing broadband mapping efforts, Connected Nation (CN) has developed a series of processes with the goal of submitting mapping data to NTIA for every known and qualifying last-mile broadband provider, regardless of whether the provider has chosen to support and participate in the State Broadband Initiative mapping program.

The following narrative provides detail regarding the recent data collection activities related to Wireless Technology Solutions (WTS), a wireless Internet service provider (WISP), located in Alto, Michigan, with a service area around southern Kent County. The narrative will include information regarding how and where CN obtained publicly available data and the on-the-ground due diligence, verification, and field validation techniques that support the underlying data.

Background

CN staff members have continued trying to obtain the participation of the provider with 38 instances of communication via telephone and e-mail sessions since December 30, 2009, through February 13, 2013. Over this period of time, four telephone conversations were held and one e-mail communication reply was received from a company representative on May 10, 2010. The initial provider response was a reluctance to participate in a new government program, but, over time, there came an expressed willingness to participate. A CN staff member attempted to schedule a visit at the WTS office on September 12-13, 2012, to discuss the broadband mapping project in person with WTS staff, but no one from WTS ever confirmed the appointment.

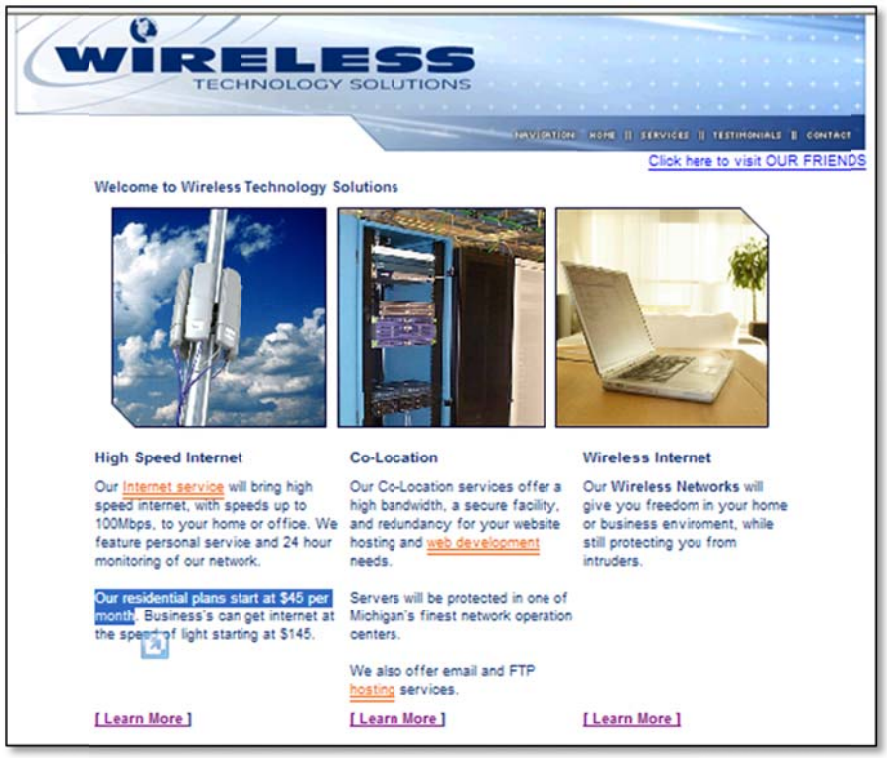
The Issue

WTS, by its general lack of responsiveness since December 30, 2009, has predicated its unwillingness to participate in the Connect Michigan broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN began building a file based on research information and, as time progressed, enriched the file with information obtained through the public domain and from other area fixed wireless providers. For example, CN reviewed the provider's website (www.wirelesstechsolutions.com) to determine the provider offered residential service **(Exhibit A)**. There was no reference found on the provider's website defining provider's service area, or service plans. A search for a Federal Registration Number (FRN) on the FCC **CO**mmission **RE**gistration **S**ystem (CORES) system did not yield an FRN.

Exhibit A: Residential Service



Preliminary Identification of Provider's Coverage Area

Connected Nation received anecdotal information about the WTS service area from other area fixed wireless providers who share a similar tower site. These discussions also led to the discovery of a second site belonging to WTS. The tower site information was utilized to create a Google Earth image overlay **(Exhibit B).** The image overlay was positioned to match the Google Earth base map's roadways, county boundaries, and water bodies. The degree of accuracy of the image overlay was maintained at less than .25 mile to establish a minimum search criteria of a potential transmit site locations for the wireless access points. The provider's service area depiction is represented by tower pins as shown in Exhibit B. The two locations' coordinates were inputted into Google Earth and examined utilizing the zoom option of the aerial imagery. Both locations structures were identified and the locations were then entered into the Microsoft *Streets and Trips* mapping application **(Exhibit C)** to develop a route for the validation process.

Exhibit B: Google Earth - Provider's Service Area Image Overlay

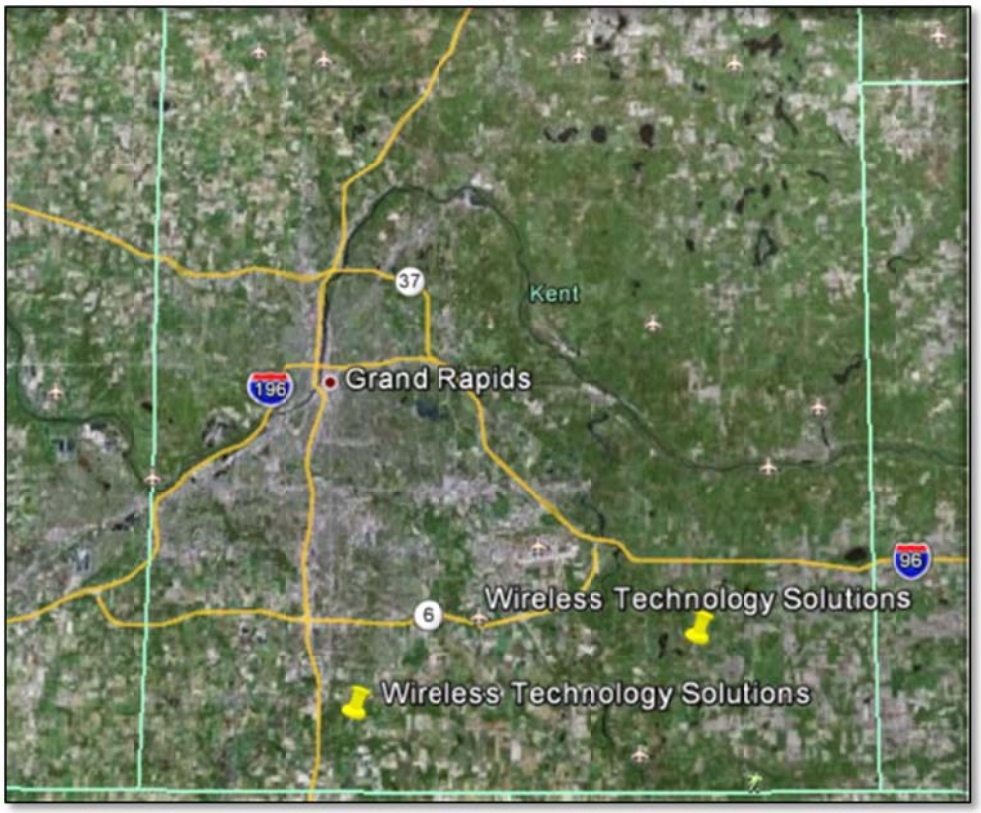
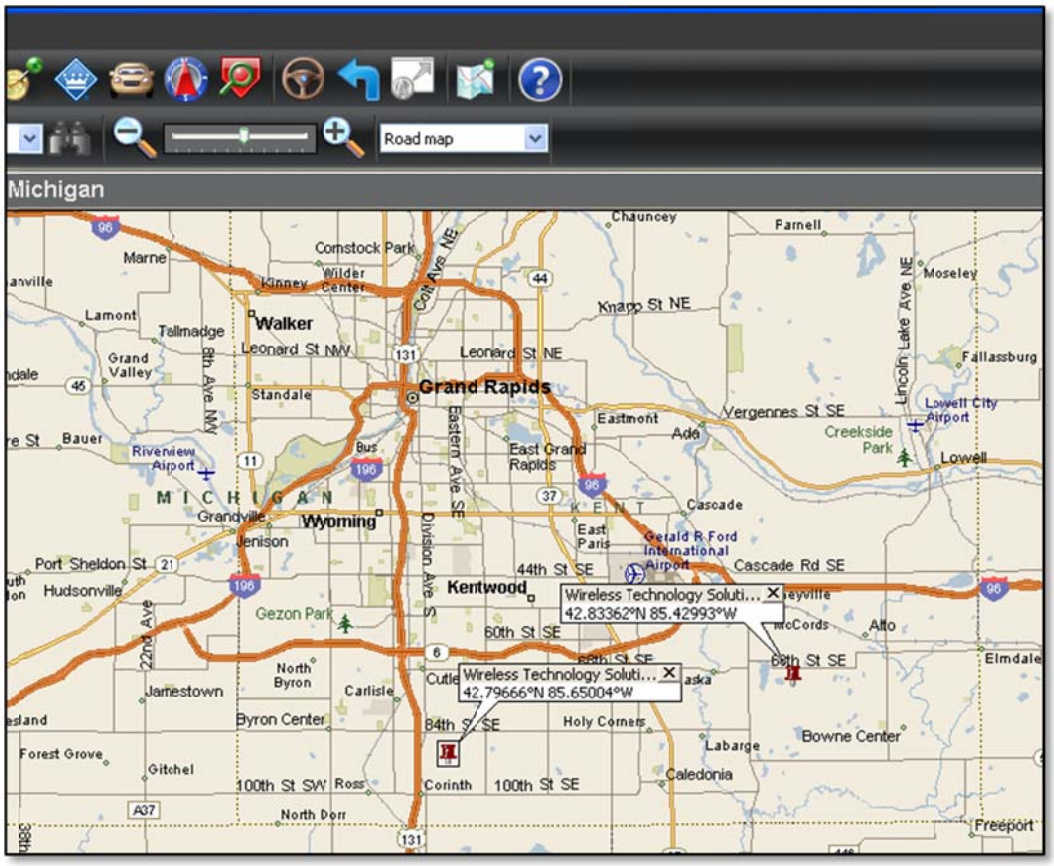


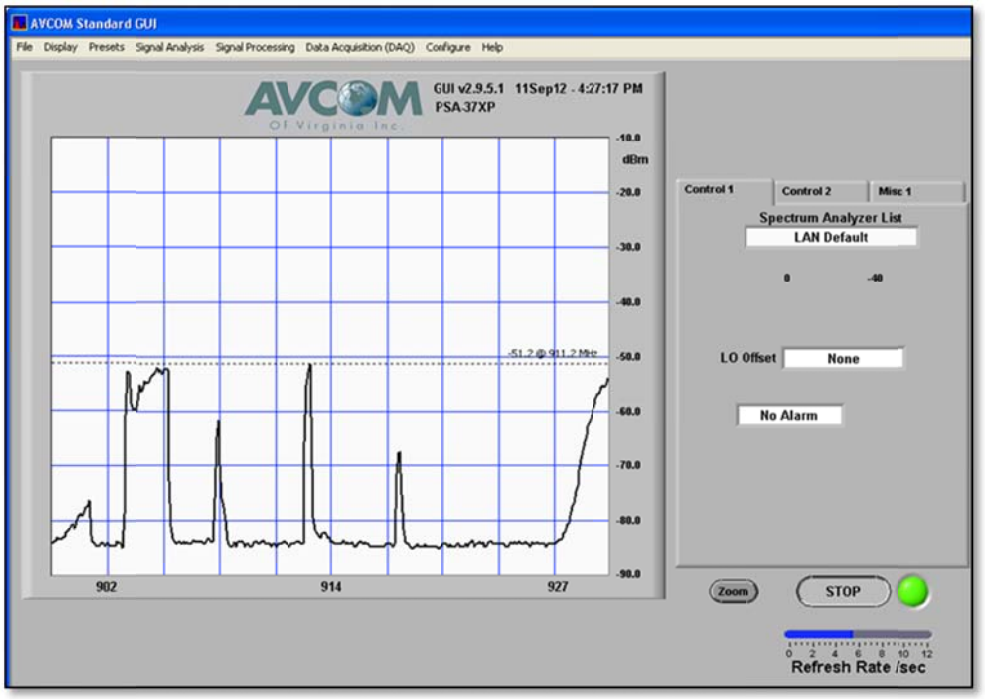
Exhibit C: Validation Points for Transmit Sites

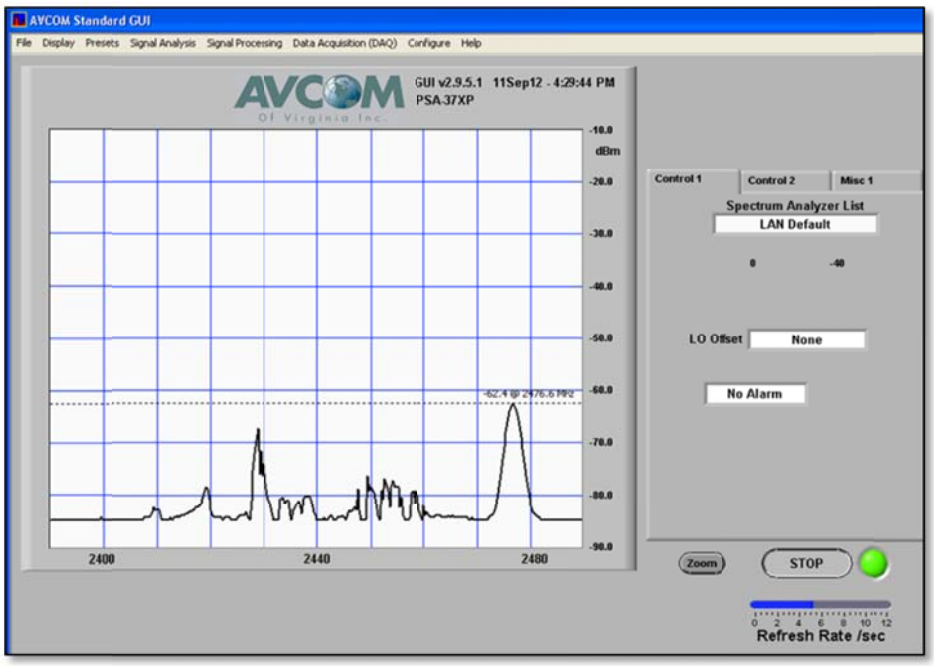


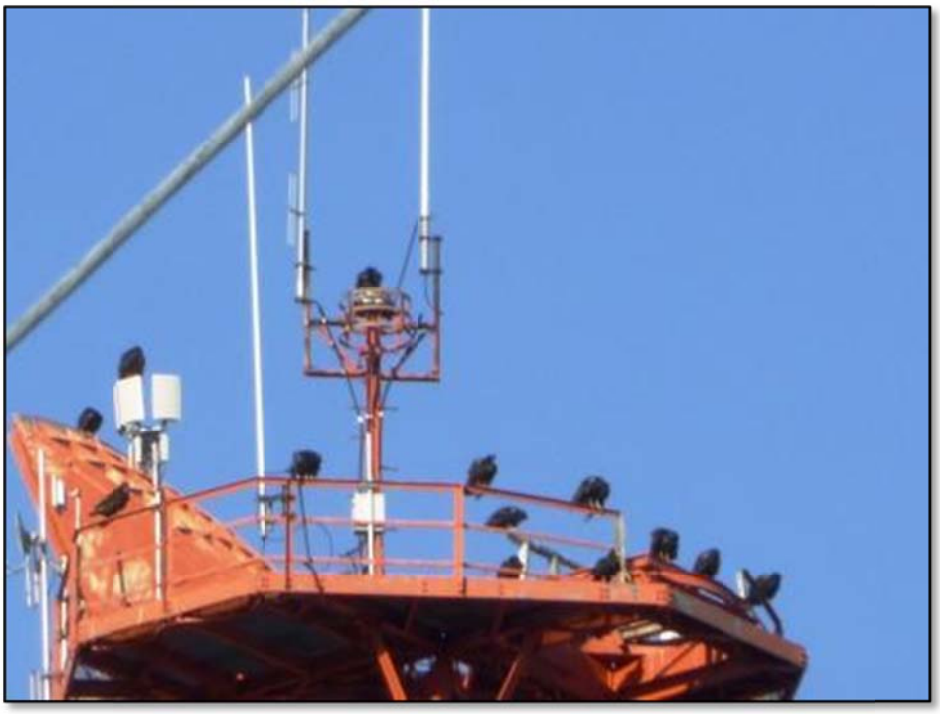
Testing Techniques

Connected Nation staff developed a site validation route based on data established from the Google Earth image overlay and publicly available data through other area fixed wireless providers who have an intimate knowledge of WTS's service area. The CN wireless engineer was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands **(Exhibit D)**. Each validation point was scrutinized for frequency of operation. A screen image of the operating frequency (or frequencies) was captured; general notes were recorded for each location-approximate antenna height, frequency of operation, antenna type (omnidirectional or sectored) and photographs were taken of the tower sites and various wireless access points.

Exhibit D: Field Data for Wireless Technology Solutions Office/Hub Location Byron Center





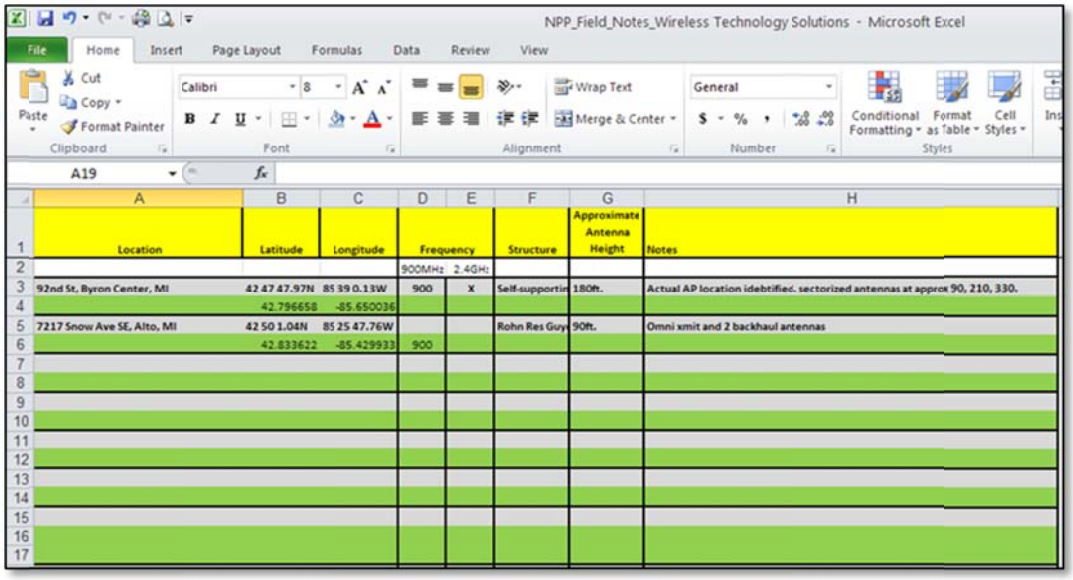


Results and Submission for April 2013

Of the two locations visited during the validation point route, no less than two access points were identified and relative information was logged into the WTS field validation notes file **(Exhibit E)**. The field data and the publicly available data were transferred to the Connected Nation provider information file. A composite propagation study was completed based on the field data that was

gathered and verified **(Exhibit F)**. Both documents were forwarded to Wireless Technology Solutions. The provider was advised that the information would be submitted to Connect Michigan and the NTIA for processing during the April 2013 mapping submission cycle, unless the provider identified any discrepancies within 48 hours. As of this report submission, no word has been received from the provider.

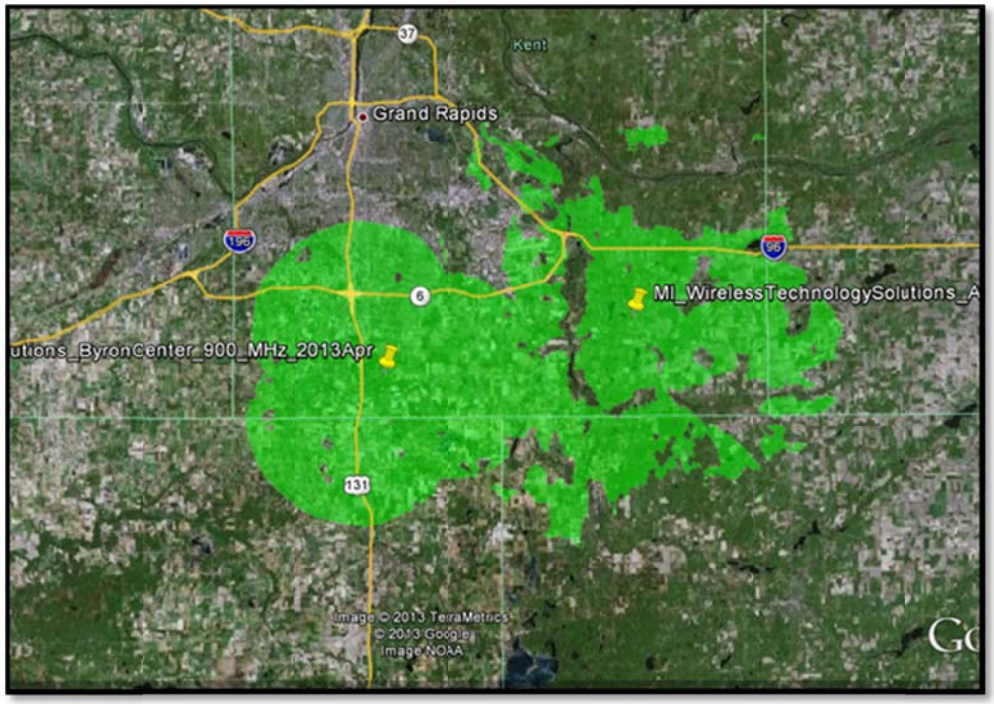
Exhibit E: Field Validation Note



NPP_Field_Notes_Wireless Technology Solutions - Microsoft Excel

	Location	Latitude	Longitude	Frequency		Structure	Approximate Antenna Height	Notes
2				900MHz	2.4GHz			
3	92nd St, Byron Center, MI	42 47 47.97N	85 39 0.13W	900	X	Self-supportin	180ft.	Actual AP location idebtified. sectorized antennas at approx 90, 210, 330.
4		42.796658	-85.650036					
5	7217 Snow Ave SE, Alto, MI	42 50 1.04N	85 25 47.76W			Rohn Res Guy	90ft.	Omni xmit and 2 backhaul antennas
6		42.833622	-85.429933	900				

Exhibit F: Wireless Technology Solutions Composite Coverage



APPENDIX B: BROADBAND PROVIDER LOG

Broadband Provider Log

Complete	193
Non-Responsive/Refused	9
In Progress	1
Reseller Providing Data	4
Count of Datasets by Status	**207**
Total Unique Providers Represented	**140**

Provider Name	Platform	Status	NDA Execution Date	Notes
Ace Telephone Company of Michigan Inc.	DSL	Data Added to Statewide Inventory	1/12/2010	[MAR-06-13 Brian Dudek] Correction: Provider indicated southern border of Old Mission coverage should stop at exchange boundary.
Agri-Valley Communications, Inc.	Fixed Wireless	Data Added to Statewide Inventory	1/22/2010	[FEB-27-13 Brian Dudek] Change: New provider subsidiary for April 2013 submission.
Agri-Valley Communications, Inc.	Mobile Wireless	Data Added to Statewide Inventory	1/22/2010	[FEB-27-13 Brian Dudek] Change: Provider added 4 new site locations filling in some small gaps.
AT&T Inc.	DSL	Data Added to Statewide Inventory	12/16/2009	[FEB-20-13 Brian Dudek] Change/Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
AT&T Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/16/2009	[FEB-25-13 Brian Dudek] Change/Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission. There is notable expansion in multiple locations. Also added 4G services in three parts of the state.
ATI Networks, Inc.	Fixed Wireless	Data Added to Statewide Inventory	2/10/2010	[FEB-25-13 Brian Dudek] Correction: New provider platform for April 2013 submission in which the provider was previously non-responsive.
Carr Communications, Inc.	DSL	Data Added to Statewide Inventory	1/15/2010	[FEB-01-13 Brian Dudek] Change: Provider upgraded infrastructure and now offers tier 6 max advertised download speeds. Slightly altered boundary to correspond with exact exchange bounds.
CenturyLink	DSL	Data Added to Statewide Inventory	12/4/2009	[FEB-18-13 Brian Dudek] Change/Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
City of Negaunee	Cable	Data Added to Statewide Inventory		[JAN-15-13 Sarah Finne] Change: Provider now offers residential broadband service.
Clearwire Corporation	Mobile Wireless	Data Added to Statewide Inventory	3/17/2011	[JAN-04-13 Brian Dudek] Change: Minor increase and decrease of mobile coverage in some areas. Refined propagations.
Comcast Cable Communications, LLC	Cable	Data Added to Statewide Inventory	12/7/2009	[FEB-26-13 Brian Dudek] Change/Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Crystal Automation Systems, Inc	Fixed Wireless	Data Added to Statewide Inventory	6/25/2010	[FEB-28-13 Brian Dudek] Change: Provider expanded wireless coverage mainly in Newaygo, Mecosta, and Ionia Counties.
D&P Communications, Inc.	Fiber	Data Added to Statewide Inventory	3/8/2011	[JAN-17-13 Brian Dudek] Change: Provider expanded fiber territory into parts of the city of Adrian.
Daystarr Communications, LLC	Fiber	Data Added to Statewide Inventory		[FEB-15-13 Brian Dudek] Change: Provider expanded fiber territory into the towns of Laingsburg, Saint Johns, Ovid, and Durand. Some expansion also present in Owosso and Corunna. Upgraded infrastructure and now offers 1 Gbps speeds.
Daystarr Communications, LLC	DSL	Data Added to Statewide Inventory		[FEB-15-13 Brian Dudek] Change: Provider expanded DSL territory in Shiawassee and Clinton Counties. Also upgraded infrastructure and now offers tier 7 max advertised download and tier 3 upload speeds.
DMCI Broadband, LLC	Fixed Wireless	Data Added to Statewide Inventory	2/3/2010	[MAR-01-13 Brian Dudek] Change: Provider refined and expanded wireless territory. Most of the expansion is in St. Joseph and Calhoun Counties.
FNW, LLC	Fixed Wireless	Data Added to Statewide Inventory	2/12/2010	[JAN-29-13 Brian Dudek] Change: Provider particularly expanded into the southeastern portion of Allegan County. Also upgraded infrastructure to now offer tier 6 and 7 max advertised download speeds along with tier 5 max advertised upload speeds.
Fourway Computer Products, Inc.	Fixed Wireless	Data Added to Statewide Inventory		[FEB-07-13 Brian Dudek] Change: Provider refined coverage area between Berrien Springs and Buchanan. Coverage also available south of Galen and south of Edwardsburg from Indiana transmission locations.
Frontier Communications Corporation	DSL	Data Added to Statewide Inventory	1/22/2010	[FEB-22-13 Brian Dudek] Change: Provider gave varying line distances for many areas in MI resulting in more accurate speeds. Also expanded coverage in some areas across the state.
Great Lakes Comnet, Inc.	DSL	Data Added to Statewide Inventory		[MAR-06-13 Sarah Finne] Change: Great Lakes Comnet acquired the assets of Westphalia Telephone Company, thereby adding DSL services to their portfolio.
I-2000, Inc.	Fixed Wireless	Data Added to Statewide Inventory	3/7/2011	[FEB-27-13 Brian Dudek] Change: Provider removed two transmission sites and added two transmitters. Very minor additions.
ISP Management, Inc.	Fixed Wireless	Data Added to Statewide Inventory	3/22/2010	[MAR-01-13 Brian Dudek] Change: Provider expanded wireless territory into majority of Clare County.
KPBIZnet, LLC	Fixed Wireless	Data Added to Statewide Inventory	10/30/2012	[MAR-01-13 Brian Dudek] Change: New provider for the April 2013 submission.

LakeNet LLC	Fixed Wireless	Data Added to Statewide Inventory	12/27/2011	[FEB-14-13 Brian Dudek] Change: Provider expanded coverage in many areas, particularly in southern Midland and west Saginaw County (Hemlock area).
Lewiston Communications	Cable	Data Added to Statewide Inventory		[JAN-28-13 Brian Dudek] Correction: New provider for April 2013 submission that was previously non-responsive.
MegaPath Corporation	DSL	Data Added to Statewide Inventory	2/15/2010	[FEB-14-13 Brian Dudek] Change/Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Mercury Network Corporation	Fixed Wireless	Data Added to Statewide Inventory	3/9/2011	[MAR-01-13 Brian Dudek] Change/Correction: Provider refined and expanded wireless coverage. Expansion particularly around town of Coleman in Isabella and Midland Counties.
MetaLINK Technologies, Inc.	Fixed Wireless	Data Added to Statewide Inventory	3/22/2010	[FEB-27-13 Brian Dudek] Change: Provider added a 3650 sector to their existing wireless service area.
Michwave Technologies, Inc.	Fixed Wireless	Data Added to Statewide Inventory	3/12/2010	[FEB-28-13 Brian Dudek] Change: Provider added multiple transmission points that extends their main wireless coverage. In addition, they also now service portions of Mason County. Can now offer tier 6 max advertised download and upload speeds in some areas.
Newaygo County Advanced Technology Services	Fixed Wireless	Data Added to Statewide Inventory		[JAN-10-13 Brian Dudek] Change: Refined propagations indicate minor increase and decrease of wireless coverage in some areas.
Northside TV Corporation	Cable	Data Added to Statewide Inventory		[FEB-20-13 Brian Dudek] Change: Provider expanded cable coverage in Iron Mountain and upgraded infrastructure to now offer tier 6 max advertised upload speeds.
Pasty.net, Inc.	Fixed Wireless	Data Added to Statewide Inventory	1/6/2010	[MAR-04-13 Sarah Finne] Change: Provider deactivated some unlicensed towers (therefore, removing some unlicensed - tier 3 coverage). They also activated some additional tier 3 unlicensed towers in other areas, and added a new tier 6 licensed tower in the area that was removed.
Skycasters	Satellite	Data Added to Statewide Inventory	10/16/2012	[OCT-29-12 Brian Dudek] Correction: Initial submission of provider's coverage, but they were in service previously.
Skyweb Networks, Inc.	Fixed Wireless	Data Added to Statewide Inventory		[MAR-05-13 Sarah Finne] Correction: SkyWeb Networks was previously non-responsive, but they provided data this round.
Small Business Solutions Group L.L.C.	Fixed Wireless	Data Added to Statewide Inventory	7/20/2010	[MAR-01-13 Brian Dudek] Change: Provider expanded wireless territory in Jackson and Washtenaw Counties by changing antenna heights and adding sectors. Upgraded infrastructure allow for tier 5 max advertised download and tier 3 max advertised upload.
SpeedNet, LLC	Fixed Wireless	Data Added to Statewide Inventory	1/7/2010	[JAN-28-13 Brian Dudek] Change/Correction: Provider refined propagations and removed some equipment, but also expanded in some areas as well. 4G expansion is particularly noticeable in St. Clair County.
Sprint Nextel Corporation	Mobile Wireless	Data Added to Statewide Inventory	1/14/2010	[FEB-22-13 Brian Dudek] Change: Provider expanded coverage in the north-central and southwest portions of the state. Also now offers speeds of tier 6 max advertised download and tier 4 max advertised upload in a small portion of southwest MI.
Summit Digital Holdings, Inc.	Cable	Data Added to Statewide Inventory		[JAN-10-13 Brian Dudek] Change: Provider expanded cable territory into the city of McBain. In addition, upgraded infrastructure and can now offer tier 6 download and tier 4 upload speeds throughout.
Summit Digital Holdings, Inc.	Fixed Wireless	Data Added to Statewide Inventory		[FEB-07-13 Brian Dudek] Change: Provider added 3 access points and upgraded infrastructure allowing tier 6 download and tier 4 upload max advertised speeds.
T-Mobile USA, Inc.	Mobile Wireless	Data Added to Statewide Inventory	1/8/2010	[FEB-25-13 Brian Dudek] Change/Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission. There is notable expansion in SW MI around Cassopolis.
TDS Telecommunications Corporation	DSL	Data Added to Statewide Inventory	1/27/2010	[FEB-12-13 Brian Dudek] Change/Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission. Expansion mainly under Chatham Telephone Company.
The Computer Care Company, Inc.	Fixed Wireless	Data Added to Statewide Inventory	3/8/2011	[FEB-14-13 Brian Dudek] Change: Provider added one transmission point to now provide service to the town of Morenci.
Tucker Communications, Inc	Fixed Wireless	Data Added to Statewide Inventory	2/17/2011	[MAR-01-13 Brian Dudek] Change: Provider expanded wireless territory into multiple locations in west central MI.
Vergennes Broadband LLC	Fixed Wireless	Data Added to Statewide Inventory	1/23/2013	[FEB-27-13 Brian Dudek] Change: New provider for April 2013 submission.
Verizon North Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/14/2009	[FEB-22-13 Brian Dudek] Change/Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission. There is definitely significant 4G expansion across the state.
Conterra Ultra Broadband, LLC	Backhaul	Backhaul Provider Only Processing Complete		
Daystarr Communications, LLC	Backhaul	Backhaul Provider Only Processing Complete		
Great Lakes Comnet, Inc.	Backhaul	Backhaul Provider Only Processing Complete		
KPBIZnet, LLC	Backhaul	Backhaul Provider Only Processing Complete	10/30/2012	
Level 3 Communications, LLC	Backhaul	Backhaul Provider Only Processing Complete	12/14/2009	
MegaPath Corporation	Backhaul	Backhaul Provider Only Processing Complete	2/15/2010	
Merit Network, Inc.	Backhaul	Backhaul Provider Only Processing Complete	6/21/2010	
Sprint Nextel Corporation	Backhaul	Backhaul Provider Only Processing Complete	1/14/2010	
T-Mobile USA, Inc.	Backhaul	Backhaul Provider Only Processing Complete	1/8/2010	

ATI Networks, Inc.	Cable	Speed Only Update; Data Processing Complete	2/10/2010	[FEB-26-13 Brian Dudek] Change: Provider upgraded infrastructure and now offers tier 7 max advertised download and tier 4 max advertised upload speeds.
Barry County Telephone Company	DSL	Speed Only Update; Data Processing Complete		[JAN-10-13 Brian Dudek] Change: Provider upgraded infrastructure and now offers tier 7 max advertised download speeds throughout territory.
CCI Systems, Inc.	Cable	Speed Only Update; Data Processing Complete	6/29/2010	[FEB-12-13 Brian Dudek] Change: Provider upgraded infrastructure and now offers tier 7 max advertised download speeds.
Hughes Network Systems, LLC	Satellite	Speed Only Update; Data Processing Complete	2/5/2010	[MAR-05-13 Sarah Finne] Change: Provider upgraded infrastructure and now offers tier 7 max advertised download and tier 4 max advertised upload speeds.
Vogtmann Engineering, Inc.	Cable	Speed Only Update; Data Processing Complete		[JAN-28-13 Brian Dudek] Change: Provider upgraded infrastructure and now offers tier 7 max advertised download speeds.
Vogtmann Engineering, Inc.	Fiber	Speed Only Update; Data Processing Complete		[JAN-28-13 Brian Dudek] Change: Provider upgraded infrastructure and now offers tier 7 max advertised download and upload speeds.
Bitwise Wireless, LLC	Fixed Wireless	No Update-Estimated Coverage Submitted for Non-Participating Provider		
Wireless Technology Solutions	Fixed Wireless	Estimated Coverage Submitted for Non-Participating Provider		[MAR-04-13 Sarah Finne] Correction: Estimated coverage created and submitted for non-responsive provider.
2125 Cable Company, LLC	Cable	No Update to Provide	3/22/2010	
Agri-Valley Communications, Inc.	Backhaul	No Update to Provide	1/22/2010	
Agri-Valley Communications, Inc.	DSL	No Update to Provide	1/22/2010	
Agri-Valley Communications, Inc.	Fixed Wireless	No Update to Provide	1/22/2010	
AT&T Inc.	Backhaul	No Update to Provide	12/16/2009	
Azulstar, Inc.	Fixed Wireless	No Update to Provide	1/27/2010	
Baraga Telephone Company	DSL	No Update to Provide	1/14/2010	
Baraga Telephone Company	Fiber	No Update to Provide	1/14/2010	
Barry County Telephone Company	Fiber	No Update to Provide		
Barry County Telephone Company	Fixed Wireless	No Update to Provide		
Big Bay Broadband, Inc	Fixed Wireless	No Update to Provide		
Blanchard Telephone Association, Inc.	Backhaul	No Update to Provide	6/17/2010	
Blanchard Telephone Association, Inc.	DSL	No Update to Provide	6/17/2010	
Block Communications, Inc.	Cable	No Update to Provide	4/12/2010	
Bloomingdale Telephone Company, Inc.	DSL	No Update to Provide	1/25/2010	
Bloomingdale Telephone Company, Inc.	Fiber	No Update to Provide	1/25/2010	
Bloomingdale Telephone Company, Inc.	Fixed Wireless	No Update to Provide	1/25/2010	
Cable America Michigan, LLC	Cable	No Update to Provide	3/9/2011	
CenturyLink	Backhaul	No Update to Provide	12/4/2009	
Charter Communications, Inc.	Backhaul	No Update to Provide	12/15/2009	
Charter Communications, Inc.	Cable	No Update to Provide	12/15/2009	
City of Norway	Cable	No Update to Provide	3/14/2011	
Climax Telephone Company	Backhaul	No Update to Provide	1/14/2010	
Climax Telephone Company	DSL	No Update to Provide	1/14/2010	
Climax Telephone Company	Fiber	No Update to Provide	1/14/2010	
Coldwater Board of Public Utilities	Cable	No Update to Provide	3/1/2010	
Crystal Automation Systems, Inc	Backhaul	No Update to Provide	6/25/2010	
CSInet Internet Access Corp.	Fixed Wireless	No Update to Provide	3/31/2010	
D&P Communications, Inc.	Cable	No Update to Provide	3/8/2011	
D&P Communications, Inc.	Fixed Wireless	No Update to Provide	3/8/2011	
Farmers Mutual Telephone Company of Chapin, Inc.	DSL	No Update to Provide	10/26/2010	
Fast-Air Internet, Inc.	Fixed Wireless	No Update to Provide		
Frontier Communications Corporation	Backhaul	No Update to Provide	1/22/2010	
Hiawatha Communications, Inc.	DSL	No Update to Provide	2/2/2010	
Hiawatha Communications, Inc.	DSL	No Update to Provide	2/2/2010	
Hiawatha Communications, Inc.	DSL	No Update to Provide	2/2/2010	
Hiawatha Communications, Inc.	DSL	No Update to Provide	2/2/2010	
Hiawatha Communications, Inc.	Fiber	No Update to Provide	2/2/2010	
Hidden Lake Wireless, Inc.	Fixed Wireless	No Update to Provide	3/12/2010	
I-2000, Inc.	DSL	No Update to Provide	3/7/2011	Reseller providing data.
Interlink Computers Technology, Inc.	Fixed Wireless	No Update to Provide	3/12/2010	
Iron Bay Computer & Design	Fixed Wireless	No Update to Provide	1/14/2010	
Iron River Cooperative TV Antenna Corp	Cable	No Update to Provide	7/27/2010	
ISP Management, Inc.	DSL	No Update to Provide	3/22/2010	Reseller providing data.
Kaltelco, LLC	DSL	No Update to Provide	3/5/2010	
Leap Wireless International, Inc.	Mobile Wireless	No Update to Provide	4/5/2010	
Lennon Telephone Company	Cable	No Update to Provide	1/25/2010	
Lennon Telephone Company	DSL	No Update to Provide	1/25/2010	
Lighthouse Computers, Inc.	Cable	No Update to Provide	2/17/2011	
Lighthouse Computers, Inc.	Fixed Wireless	No Update to Provide	2/17/2011	
Ligonier Telephone Company, Inc.	Fixed Wireless	No Update to Provide	3/31/2010	
Martell Cable Services, Inc.	Cable	No Update to Provide		
Mercury Network Corporation	Backhaul	No Update to Provide	3/9/2011	
MetroPCS Wireless, Inc.	Mobile Wireless	No Update to Provide	2/10/2012	
Michigan Cable Partners Inc.	Cable	No Update to Provide	6/18/2010	
Network Computers, LLC	Fixed Wireless	No Update to Provide		
Ogden Communications, Inc.	DSL	No Update to Provide	1/19/2010	
Ogden Communications, Inc.	Fixed Wireless	No Update to Provide	1/19/2010	
Parish Communications	Cable	No Update to Provide	7/1/2010	
Peninsula Fiber Network, LLC	Backhaul	No Update to Provide	1/14/2010	
RACC Enterprises, LLC	DSL	No Update to Provide		Reseller providing data.
RACC Enterprises, LLC	Fixed Wireless	No Update to Provide		
Sand Creek Communications Company	Backhaul	No Update to Provide	3/2/2010	
Sand Creek Communications Company	DSL	No Update to Provide	3/2/2010	
Scott Cook, Inc.	Fixed Wireless	No Update to Provide		
Sister Lakes Cable TV	Cable	No Update to Provide		
SMR Communications, Inc.	Cable	No Update to Provide		
SMR Communications, Inc.	Fixed Wireless	No Update to Provide		
SonicNet, Inc	Fixed Wireless	No Update to Provide	8/4/2011	
Spacenet, Inc.	Satellite	No Update to Provide		
SpeedNet, LLC	Backhaul	No Update to Provide	1/7/2010	
Springcom, Inc.	Cable	No Update to Provide	2/25/2010	
Springcom, Inc.	DSL	No Update to Provide	2/25/2010	
T2 Communications, LLC	Backhaul	No Update to Provide	3/10/2010	
TDS Telecommunications Corporation	Backhaul	No Update to Provide	1/27/2010	

The Computer Care Company, Inc.	Backhaul	No Update to Provide	3/8/2011	
The Computer Care Company, Inc.	DSL	No Update to Provide	3/8/2011	
The Iserv Company, LLC	Backhaul	No Update to Provide	6/21/2010	
The Iserv Company, LLC	DSL	No Update to Provide	6/21/2010	Reseller providing data.
The Iserv Company, LLC	DSL	No Update to Provide	6/21/2010	
The Iserv Company, LLC	Fiber	No Update to Provide	6/21/2010	
Time Warner Cable Inc.	Cable	No Update to Provide	12/21/2009	[MAR-06-13 Sarah Finne] Change: Time Warner has changed their reported provider name to "Time Warner Cable Inc." and their FRN to 0007556251.
Town & Country Cable and Telecommunications, LLC	Cable	No Update to Provide	6/18/2010	
United States Cellular Corporation	Mobile Wireless	No Update to Provide	2/15/2011	
Upper Peninsula Telephone Company	DSL	No Update to Provide	1/11/2010	
US Signal Company, LLC	Backhaul	No Update to Provide	2/25/2010	
Verizon North Inc.	Backhaul	No Update to Provide	12/14/2009	
ViaSat, Inc.	Satellite	No Update to Provide	1/8/2010	
Vision Quest Technology Solutions	Fixed Wireless	No Update to Provide		
Waldron Communication Company	DSL	No Update to Provide	1/12/2010	
Waldron Communication Company	Fixed Wireless	No Update to Provide	1/12/2010	
WideOpenWest Michigan, LLC	Cable	No Update to Provide		
Winn Telephone Company	DSL	No Update to Provide	6/28/2010	
Winn Telephone Company	Fiber	No Update to Provide	6/28/2010	
Winn Telephone Company	Fixed Wireless	No Update to Provide	6/28/2010	
Wyandotte Municipal Services	Cable	No Update to Provide	3/23/2010	
XO Communications, LLC	Backhaul	No Update to Provide	2/12/2010	
Air Advantage, LLC	Fixed Wireless	No Update Provided – Use Last Submission Data	3/15/2010	
AIRGRANT.COM, INC.	Fixed Wireless	No Update Provided – Use Last Submission Data		
Allband Communications Cooperative	Fiber	No Update Provided – Use Last Submission Data	2/2/2010	
Allendale Telephone Company	Fiber	No Update Provided – Use Last Submission Data	2/4/2010	
Allendale Telephone Company	DSL	No Update Provided – Use Last Submission Data	2/4/2010	
Banyan OnLine Services, LLC.	Fixed Wireless	No Update Provided – Use Last Submission Data		
Bright House Networks, LLC	Cable	No Update Provided – Use Last Submission Data	4/26/2010	
Camp Communication Services, Inc.	Fixed Wireless	No Update Provided – Use Last Submission Data		
Cherry Capital Connection, LLC	Fixed Wireless	No Update Provided – Use Last Submission Data	12/28/2009	
CMS Internet LLC	Fixed Wireless	No Update Provided – Use Last Submission Data	3/11/2010	
Cogent Communications, Inc.	Backhaul	No Update Provided – Use Last Submission Data		
COLI, Inc.	Fixed Wireless	No Update Provided – Use Last Submission Data		
Custom Software Inc.	Fiber	No Update Provided – Use Last Submission Data	2/3/2010	
Custom Software Inc.	DSL	No Update Provided – Use Last Submission Data	2/3/2010	
Custom Software Inc.	Fixed Wireless	No Update Provided – Use Last Submission Data	2/3/2010	
Drenthe Telephone Company	DSL	No Update Provided – Use Last Submission Data	2/4/2010	
Endless Journey, Inc.	Fixed Wireless	No Update Provided – Use Last Submission Data		
Great Lakes High Speed, LLC	Fixed Wireless	No Update Provided – Use Last Submission Data		
Ideal Wireless, Inc.	Fixed Wireless	No Update Provided – Use Last Submission Data		
Internet 123, Inc.	Backhaul	No Update Provided – Use Last Submission Data		
Invisalink Wireless Enterprises LLC	Fixed Wireless	No Update Provided – Use Last Submission Data	4/13/2010	
KEPS Technologies, Inc.	Fixed Wireless	No Update Provided – Use Last Submission Data		
KEPS Technologies, Inc.	DSL	No Update Provided – Use Last Submission Data		
Niagara Telephone Company	DSL	No Update Provided – Use Last Submission Data	1/22/2010	
Niagara Telephone Company	Backhaul	No Update Provided – Use Last Submission Data	1/22/2010	
Nodin Communications, LLC	Fixed Wireless	No Update Provided – Use Last Submission Data	4/22/2010	
Tri-County Wireless, Inc.	Fixed Wireless	No Update Provided – Use Last Submission Data		[DEC-10-12 Terry Holmes] Sent formal request e-mail. Received e-mail response from company representative stating they wish to be removed from our email list. I responded that I am obligated to contact every viable broadband provider and solicit their pertinent data.
West Michigan Broadband, LLC	Fixed Wireless	No Update Provided – Use Last Submission Data		
Windstream Communications	DSL	No Update Provided – Use Last Submission Data		
Windstream Communications	Backhaul	No Update Provided – Use Last Submission Data		
Windstream Communications	Backhaul	No Update Provided – Use Last Submission Data		
Xyotek, LLC	Fixed Wireless	No Update Provided – Use Last Submission Data		
Zayo Bandwidth, LLC	Backhaul	No Update Provided – Use Last Submission Data		
Zing Networks, Inc.	Fixed Wireless	No Update Provided – Use Last Submission Data		
Windstream Communications	DSL	Solicited Initial Data		
Crystal Cable TV	Fixed Wireless	Non-Responsive to Multiple Attempts		9 contact attempts were made this period.

FiberTower Corporation	Backhaul	Non-Responsive to Multiple Attempts		In addition to multiple contact attempts made during the last mapping submission period, 4 contact attempts were made this period.
Lynx Network Group, LLC	Backhaul	Non-Responsive to Multiple Attempts		In addition to multiple contact attempts made during the last mapping submission period, 6 contact attempts were made this period.
M3 Wireless	Fixed Wireless	Non-Responsive to Multiple Attempts		In addition to multiple contact attempts made during previous mapping submission periods, 5 contact attempts were made this period.
Mutual Data Services, Inc.	Fixed Wireless	Non-Responsive to Multiple Attempts		In addition to multiple contact attempts made during previous mapping submission periods, 5 contact attempts were made this period.
Niagara Wireless, LLC	Fixed Wireless	Non-Responsive to Multiple Attempts		In addition to multiple contact attempts made during previous mapping submission periods, 7 contact attempts were made this period.
QHP Internet LLC	Fixed Wireless	Non-Responsive to Multiple Attempts		3 contact attempts were made this period.
Reliable Internet, LLC	Fixed Wireless	Non-Responsive to Multiple Attempts		In addition to multiple contact attempts made during previous mapping submission periods, 5 contact attempts were made this period.
SyncWave, LLC	Fixed Wireless	Non-Responsive to Multiple Attempts		8 contact attempts were made this period.

OFFICIAL APRIL 2013 UPDATE SUBMISSION TO THE NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION UNDER THE STATE BROADBAND INITIATIVE GRANT PROGRAM FOR THE STATE OF MINNESOTA

April 1, 2013

TABLE OF CONTENTS

April 1, 2013

Ms. Anne W. Neville
SBI Grant Program Director
National Telecommunications and Information Administration
U.S. Department of Commerce
Room 4716
1401 Constitution Avenue, NW
Washington, DC 20230

Dear Ms. Neville:

As the State Broadband Designated Entity, in partnership with the Minnesota Department of Commerce, please accept this submission from Connected Nation on behalf of the state of Minnesota's State Broadband Initiative (SBI) Grant Program, known as Connect Minnesota.

Connected Nation and Connect Minnesota congratulate the National Telecommunications and Information Administration (NTIA) and the Federal Communications Commission (FCC) on achieving the two-year anniversary of the National Broadband Map. Truly, now more than ever, the significance of complete and validated data through this effort is impacting lives in communities all across our great country. The Connect Minnesota program and its collective stakeholder community continue to be faithful and energized contributors, and we are proud to play such a part in forging the innovation economy of the twenty-first century.

The artifacts that comprise this submission should be found to be compliant with the April 1, 2013, deadline for the semi-annual data update and in accordance with the terms of the July 1, 2009, Notice of Funds Availability (NOFA) and all subsequent clarifications pertaining to delivery of state-level mapping of broadband service availability. This packet includes:

Inventory of Deliverables, Connect Minnesota: April 1, 2013

NOFA Requirement	Data Transfer Model	Data Description
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in Census Blocks of No Greater Than Two Square Miles in Area
Appendix A: 1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census Blocks Larger in Area Than Two Square Miles

Appendix A: 1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address
Appendix A: 3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points
Appendix A: 4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing
Appendix A: 4	n/a	Community Anchor Institutions-Narratives
VII.A.1(a)	n/a	Accuracy and Verification Report
n/a	DataPackage.xlsx	Worksheets of Contact Information, Record Count, and Provider Summary Table
n/a	n/a	List of Changes and Corrections to the Dataset
n/a	n/a	Non-Participating Provider (NPP) Narratives
n/a	n/a	Broadband Provider Roster and Participation Status

In addition, this data update submission should be found to be compliant with the additional program requirements instituted by the National Telecommunications and Information Administration since the time of the October 2012 SBI data submission for the Connect Minnesota program. Specifically, these new requirements are:

SBI Data Transfer Model

The submission of the broadband dataset for April 1, 2013, is contained within the SBI Data Transfer Model as released on the Grantee Workspace on December 14, 2012. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information on each provider as possible.

Additional Submission Guidance

On February 8, 2013, NTIA released new guidance regarding the processing of wireless data, for both fixed and mobile broadband providers. All wireless provider coverage records have been reviewed and are in compliance with this grantee guidance for this April 2013 submission period. Even providers that did not have an update for this submission cycle were reviewed and data reprocessed as necessary for those records that were not yet in compliance with the new guidance.

This submission continues to follow the speed technology guidance released by the Program Office on August 9, 2012, to review speed tier codes in correspondence with technology of transmission codes. In the October 2012 submission, descriptions were provided in the methodology paper that offered an explanation for any submitted technology of transmission and speed combinations that were outside of the expected value range. That practice continues in this submission as technology and speed combinations are reviewed

and scrutinized; any questionable information supplied by providers is reviewed more in depth with the provider to ensure the information is accurately captured or a proper explanation is provided as to why the speed information should be submitted as supplied even if it falls outside the expected value range.

This submission also includes narratives describing the data and coverage estimation of non-participating providers. While Connect Minnesota continues outreach to all providers prior to each submission period, the need to submit broadband service data for all providers regardless of their participation is evident as the SBI program continues into this seventh round of data submissions. The submission of this estimated broadband service area for providers that have not supplied data to Connect Minnesota is essential in being able to portray a more accurate depiction of the current broadband landscape.

This April 2013 semi-annual data update under the SBI Grant Program continues to demonstrate our dedication to implementing the joint purposes of the Recovery Act and the Broadband Data Improvement Act (BDIA) by gathering comprehensive and accurate state-level broadband mapping data, developing state-level broadband maps, aiding in the development and maintenance of the National Broadband Map, and undertaking statewide initiatives for broadband planning.

Broadband Service Availability — Provider Outreach and Verification

This data update submission under the SBI program includes datasets for 99.21 percent of the Minnesota provider community, or 125 of 126 total providers. There are 119 participating providers and 6 additional non-participating providers whose estimated coverage areas have been submitted. Of the 119 participating providers, 58 supplied an update to their network or coverage area(s), while 56 have reported no change. The remaining 5 represent providers who previously supplied data but were non-responsive in the April 2013 update effort; therefore, their previous dataset is being put forward as part of this compilation. A complete roster by provider depicting participation status and contact history is contained herein. The remaining provider that is not represented in the attached datasets was non-responsive to multiple contact attempts.

As the aforementioned roster and attached methodology documentation will attest, it is the collective opinion of the Connect Minnesota principals that all commercially reasonable efforts were made to account for 100 percent of the known Minnesota broadband provider community, pursuant to this semi-annual data update submission.

Connect Minnesota has also continued to perform broadband verification activities through several means. In addition to confirmation of service area(s) by each provider, Connect Minnesota also conducts field validation efforts. To date, 97 (76.98 percent) providers have been validated through field verification activities. During this submission cycle, Connect Minnesota was invited by the Leech Lake Band of Ojibwe (LLBO) Tribal Nation to engage in a field verification and validation exercise on their reservation. While on the reservation, CN completed 1,103 mobile broadband speed tests supplemented by an additional 150 test points (many times logging 3-5 tests per point). Additional details on verification activities are contained within the Field Validation Methodology.

The Connect Minnesota website, (www.connectmn.org), continues to serve a prominent role in the outreach and data collection effort. This program asset provides a way for the general public to participate in the process by offering interactive tools for users to test their connection speed, submit broadband inquiries, or contact a program representative.

As an indicator of stakeholder penetration, the Connect Minnesota website encountered 5,807 unique visits during this reporting period (29,642 total to date for the life of the grant awarded on December 20, 2009. Additionally, this pronounced Web activity netted 9 broadband inquiries over this same reporting period (178 grant inception to date). The website also provides access to the My ConnectView™ interactive mapping application, which allows consumers and broadband providers to confirm or dispute the coverage represented on the broadband inventory map. These consumer-initiated actions are facilitated through the Connect Minnesota website and the Connect Minnesota interactive mapping tool (My ConnectView™) that offer the stakeholders the vehicles to provide information regarding availability in their respective service area, either in affirmation or contest of the reported data represented in the Connect Minnesota mapping artifacts. Since the initial data collection and release of corresponding maps, feedback in the form of broadband inquiries has allowed Connect Minnesota to identify additional areas that are in need of field validation, which is scheduled as soon as possible.

Community Anchor Institutions

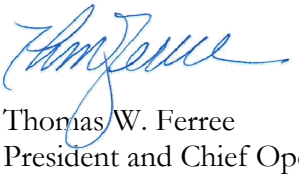
Connect Minnesota continues to make significant inroads to gather data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. This uptick in CAI data collection was further supported by NTIA's outreach to grantees reiterating the importance of this outreach. With the continued commitment of the Minnesota Department of Commerce, we have continued to focus on a relationship-oriented approach with state-level agencies and organizations that generates more responses than general contact.

In conjunction with the Minnesota Department of Commerce, outreach was conducted during this data update reporting period by Connect Minnesota to continue identification of existing, centralized sources for CAI connectivity data. Additionally, outreach was coordinated to distribute the CAI survey to institutions throughout the state through multiple methods including a customized online survey available on the Connect Minnesota website. Building on past success of the September 2012 Education Campaign, February 2013 was recognized as Public Safety Month where the public safety sector was the focus of CAI data collection, research, and public affairs outreach. Connect Minnesota has developed a number of new relationships with statewide associations, such as the Minnesota Department of Health, the Minnesota Hospital Association, and the Minnesota Private College Council, to promote the importance of broadband connectivity at anchor institutions and participation in this data collection process. The value of these relationships continues to impact the entire success of the Grant Program, and the CAI engagement is a logical extension of new and existing relationships. Connect Minnesota will continue to build upon these new relationships over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

From our work in Minnesota, as well as other states, we recognize the great value of this data to future collaboration efforts within the state as well as its value to the National Broadband Map. We plan to continue to bring best practices to the Connect Minnesota efforts, along with an investment of both human and technical resources required to reach our goal of increasing the data that is secured and reported as part of this process.

The Connect Minnesota program exists to improve data on the deployment and adoption of broadband services and to assist in the extension of broadband technology across all regions of the great state of Minnesota, as well as the United States and its territories through contribution to the National Broadband Map. We look forward to the continuing work ahead and improving upon our data collection methods.

Respectfully submitted,



Thomas W. Ferree
President and Chief Operating Officer
Connected Nation, Inc.

Minnesota Community Anchor Institutions Methodology

In this seventh reporting period of the SBI, Connect Minnesota, working in close coordination with the state of Minnesota, has established an ongoing mechanism for gathering data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. Since the October 2012 data submission, the CAI outreach process method has been modified to improve data collection. Specifically, the outreach process is a more focused sector-specific and relationship-oriented approach that generates more responses than general contact.

Connect Minnesota has continued to identify and process CAI data obtained through an ongoing statewide outreach campaign. Physical address information continues to be augmented through manual sourcing and geocoded by Connect Minnesota through Esri ArcGIS software.

Connect Minnesota continues to utilize a customized online survey hosted through SurveyMonkey, with a landing page on the Connect Minnesota website that was developed during the first reporting period. This survey, in combination with a customized data-gathering spreadsheet, was distributed on a regular basis to a targeted list of CAI throughout the state as well as organizations and agencies that work closely with the CAI. The distributions were completed with the support of the state client. Connect Minnesota will continue to use these data-gathering tools for future targeted outreach efforts throughout the coming months leading up to the next reporting period. These materials are customized to fit the CAI categories as defined in the SBI NOFA.

The survey can be accessed at this link: http://www.surveymonkey.com/s/RFNMFVK.

In addition to the survey, Connect Minnesota has developed a number of new relationships with statewide associations, such as the Minnesota Department of Health, the Minnesota Hospital Association, and the Minnesota Private College Council, to promote the importance of broadband connectivity at Community Anchor Institutions and participation in this data collection process. It is apparent that these relationships are beneficial to the entire success of the grant program, and the CAI engagement is a logical extension of new and existing relationships. Connect Minnesota will continue to build upon these new relationships over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

In addition to fostering and building relationships with state agencies, associations, and organizations, Connect Minnesota has also developed a sector-specific calendar that supports CAI outreach as well as research and communications efforts. This focused approach allows a corporate commitment to capturing CAI data in addition to developing meaningful sector-specific content. Since the October 2012 submission, the sector-specific approach included a month-long public safety campaign in February 2013. During this campaign, Connect Minnesota committed to improve relationships with key stakeholders, distribute survey requests to sector representatives, and provide sector-specific education through communications and webinar resources. Outreach to and survey of hospitals, local law enforcement, and fire stations helps build awareness and establishes a centralized database of key connectivity data for planning.

Connect Minnesota conducts significant research as part of an ongoing process to identify existing, centralized sources for CAI connectivity data. In tandem with these efforts to identify existing data, Connect Minnesota continues to identify key CAI contacts in an effort to distribute and promote the online survey and raise awareness of the importance of CAI broadband connectivity. Also, when possible, Connect Minnesota works with the Minnesota Department of Commerce to identify existing relationships that can support CAI outreach.

Connect Minnesota has an ongoing mission to educate CAI throughout the state on the importance of participating in the project. Participation by these institutions will raise awareness about the importance of broadband connectivity and the need to report the requested data for inclusion on the National Broadband Map.

The greatest challenge with collecting CAI data continues to be educating the CAI about the Connect Minnesota project as well as self-awareness of their own broadband connectivity (specifically upload and download speeds). Connect Minnesota will continue to research key CAI organizations and agency contacts in an effort to raise awareness of this project among CAI. When applicable, the Minnesota Department of Commerce will continue to be briefed on the current CAI data and provided information so it can assist with outreach and promotion within the state.

A CAI summary of all processed and submitted data is provided below:

CAI Type	Total	Physical Address	Lat/Long	Technology of Transmission	Download Speed	Upload Speed
K-12 Schools	3595	3595	3565	721	632	183
Libraries	1198	1198	1119	289	496	45
Healthcare	193	193	192	58	57	57
Public Safety	1573	1573	1566	83	64	65
Higher Ed Institutions	271	271	266	89	88	89
Other Government	137	137	130	35	33	33
Other Non-Government	141	141	129	31	31	30
Total	7108	7108	6967	1306	1401	502

During the coming months, CAI data collection will be supported by regular reporting to the Connect Minnesota team. The CAI data is proving an invaluable resource to all components of the Connect Minnesota effort. The data identifies potential local champions, sector trends, and opportunities for improvement as well as opportunities to educate CAI not familiar with their current connectivity.

SBI Data Submission Methodology

The submission of the broadband dataset for April 1, 2013, is contained within the SBI Data Transfer Model and additional components as released on the Grantee Workspace on December 14, 2012. Connected Nation (CN) has reviewed all literature that relates to the release and use of this data transfer model and recognizes that it does not replace or dictate how data is stored, processed, or displayed for the state, as it is meant primarily as a means to transfer the broadband data from all states and territories and populate the National Broadband Map in a seamless fashion.
Connected Nation has complied with the following guidance documents published by NTIA:

- Technical Mapping Guide, as released on the Grantee Workspace on March 24, 2011, was followed to ensure the completeness and validity of the submission through completion steps and checklists, completing the DataPackage spreadsheet, uploading broadband datasets into the Data Transfer Model, and checking the dataset using the SBDD_CheckSubmission receipt process.
- Naming Conventions and Category of End User, as released on the Grantee Workspace on March 26, 2012, was followed to ensure the consistency of individual file and zip package naming.
- Wireless Data Processing Guidance, as sent to SBI grantees on February 8, 2013, was followed to ensure that all fixed and mobile wireless provider coverage records are submitted to NTIA as separate, closed polygons whenever there is a variation in any of the required fields.

In addition to the methodologies contained herein, the Changes and Corrections documentation, as well as the DataPackage.xls containing contact information, the data dictionary, and a provider summary table, the following feature classes are submitted within the SBI Data Transfer Model for the state of Minnesota.

Inventory of Deliverables, Connect Minnesota: April 1, 2013

NOFA Requirement	Data Transfer Model	Data Description
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in Census Blocks of No Greater Than Two Square Miles in Area.
Appendix A: 1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census Blocks Larger in Area Than Two Square Miles.
Appendix A: 1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address.
Appendix A: 3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points.
Appendix A: 4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing.

The provider data collected by CN on behalf of the state of Minnesota have been formatted per the given specifications and uploaded into the appropriate feature classes of the SBI Data Transfer Model. Wireline availability is contained within census blocks and road segments, wireless availability is contained as polygons of coverage areas, and middle-mile connections and Community Anchor Institutions are contained as point data. All speed data is contained at the census block, road segment, or wireless polygon level of availability. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information as possible.

Connected Nation has continued outreach to satellite providers on their availability, technology, and speed information, but granular coverage is not yet available. Submitted within the wireless feature class are the satellite companies providing service to Minnesota as a polygon of the state boundary. Efforts will continue to collect, process, or otherwise create more granular satellite data based on availability analyses and guidance received from NTIA. Process development continues as well to be able to create more granular satellite coverage based on satellite equipment positioning and geographic inputs.

MINNESOTA FIELD VALIDATION METHODOLOGY

CN focused a portion of its time on specific validation processes such as:

- conducting random spectrum analysis studies throughout the state using an Avcom PSA-37-XP spectrum analyzer;
- conducting mobile speed tests throughout the state using an iPhone, Android (or other smart phone) as well as provider-specific aircards (Sprint 3G/4G, Clearwire et al);
- identifying pre-selected, provider-submitted wireless transmit tower sites and cross-referencing data about that tower against the Federal Communications Commission (FCC) databases such as Antenna Structure Registration and/or the Universal Licensing System;
- cross-referencing Federal Registration Number data against available FCC Form 477 data as well as the FCC **CO**mmission **RE**gistration **S**ystem (CORES);
- validating provider submitted data (for example: latitude/longitude) using a handheld Garmin eTrex Summit GPS unit or GPS enabled software such as Microsoft *Streets & Trips*;
- locating physical wire-line attributes (such as Central Offices, Remote Terminals, CATV plant, etc.) and comparing them against provider submitted data; and
- conducting on-net and off-net speed tests using the FCC portal at http://www.broadband.gov/qualitytest/about/ or using the Ookla Net Metrics enabled speed test utility located on each of CN's program specific websites.

Additionally, CN cross-referenced numerous public documents in order to ensure that all known broadband providers were located and contacted. This included searching membership logs from trade associations (WISPA, WCAI, PCIA, etc.), the Cable Television Fact Book, Public Utility Commission records, Public Service Commission records, Chamber of Commerce, etc.

To date, Connected Nation's staff conducted on-site validation tests in Minnesota on the following providers: A Better Wireless NISP LLC; AccessMN; Ace Telephone Association; AirFiber; Airlink; Albany Mutual Telephone Association; Alliance Communications; Arrowhead Communications Corporation (also d.b.a. Hector Communications Corporation); Arrowhead Electric Cooperative Inc.; Arvig (d.b.a. diversiCOM); Arvig Communications Systems (d.b.a. East Ottertail Telephone, Loretel Systems and ACS Communications); AT&T; Barnesville Municipal Telephone; Benton Cooperative Telephone Company; Bevcomm (also d.b.a. Blue Earth Valley Telephone Company, Granada Telephone Company and Pine Island Telephone Company); Blueprint America, Inc. (d.b.a. XtraTyme Technology); Blue Sky Broadband; Bradco-WISP Inc.; Broadband Corp.; CenturyLink (formerly d.b.a. Qwest Corporation); Charter Communications; Chaska Net; Christensen Communications Company; CitEscape Communications; City of Detroit Lakes; City of Windom (d.b.a. Windomnet); Clara City Telephone Company; Clear Choice; Clearwire Corporation; Comcast Cable Communications LLC; Cross Lake; CTC Telecom; Emily Cooperative Telephone Company; Enterpoint; Evertek Enterprises LLC; Farmers Mutual Telephone; Federated Telephone; Fibernet Monticello; Frontier Communications Corporation; FTTH Communications; Garden Valley Telephone Company; Gardonville Cooperative Telephone Association (also d.b.a. Wisper Wireless); Genesis Wireless; Halsted Telephone; Harmony Telephone Company; Hickory Tech Corporation (also d.b.a. IdeaOne); Info Link Wireless Inc.; Interstate Telecommunications Cooperative Inc.; Invisimax; JAB Wireless (formerly d.b.a. KeyOn Communications); Jaguar Communications; Johnson Telephone Company; Kassor and Manterville Telephone Company; Lakesarea Wireless; Lakenet Communications; Lonsdale Telephone; Mabel Cooperative Telephone Company; Manchester Hartland Telephone; Mediacom; Midcontinent Communications (d.b.a. US Cable); Mille Lacs Electric Cooperative; Minnesota Valley Telephone Company; Minnesota Valley TV Improvement Corporation; Nate's Net; New Ulm Telecom Inc. (also d.b.a. Sleepy Eye Telephone Company); Nextera Communications; Northfield Wireless; Park Region Mutual Telephone (d.b.a. Otter Tail Telecom); Paul Bunyan Telephone; Polar Telcom Inc.; Radiolink Internet; Red River Rural Telephone Association; River Valley Telecommunications Cooperative; Rothsay Telephone; Scared Heart Telephone Company; SCI Cable; Scott Rice Telecommunications Cooperative; Sheehan Gas; Sioux Valley Wireless; SMBS (Southwest Minnesota Broadband Services); Southern Cablevision; Spring Grove Cooperative Telephone Company; Sprint; Starpoint Communications Inc. (d.b.a. Netpoint); TDS Telecommunications Corporation; T-Mobile USA; TotheHome; U.S. Internet Corporation (d.b.a. USI Wireless); Upsala Cooperative Telephone Company; VAL-ED Joint Venture; Verizon Communications; Western Telephone Company; Wide Open West (formerly d.b.a. Knology of the Plains); Windstream Communications (acquired Lakedale LINK); Winnebago Cooperative Telephone Association; Wolverton Telephone; and Woodstock Telephone Company.

Connect Minnesota was invited by the Leech Lake Band of Ojibwe Tribal Nation to engage in a field verification and validation exercise to determine the accuracy of the broadband coverage areas on the LLBO reservation as reported by those providers participating in the Connect Minnesota, State Broadband Initiative (SBI) program. CN dispatched four staff members to conduct the testing from February 4 through February 8, 2013.

By way of example, of the aforementioned 1,103 mobile broadband tests were conducted:

1. 458 tests meet or exceed 768 kbps x 200 kbps.
2. 544 tests are below 768 kbps x 200 kbps.
3. 101 tests held "invalid" results.

Of 1,103 the mobile test points, 877 were collected **within** the boundaries of the LLBO reservation:

1. 358 tests meet or exceed 768 kbps x 200 kbps.
2. 435 tests are below 768 kbps x 200 kbps.
3. 84 tests held "invalid" results.

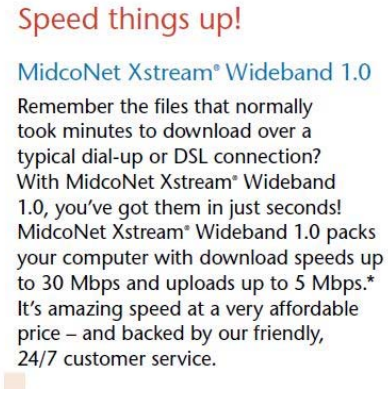
In addition to the field verification tests that have been conducted, Connected Nation has also conducted work in the field to collect information for the non-participating providers, Access MN, AirFiber, Lakesarea Wireless, and Nate's Nets, which, by nature of the methodology required for this collection, are also included in the above list.

From program initiation through this reporting period, CN has completed in-the-field validation testing against 97 companies (out of a universe of 126 viable providers) totaling 76.98 percent within the state of Minnesota. This percentage also considers the non-participating provider records submitted to NTIA as may be contained herein (see "Data Submission and Coverage Estimation of Non-Participating Provider" below).

CN has also continued to review provider datasets for accurate speed information, platform listings, and other intricacies that may fall outside of the standard SBI Data Transfer Model parameters, as published on the NTIA Grantee Workspace on December 14, 2012. Any providers whose submitted coverage and attributes are anticipated to come into question have been further reviewed and confirmed; details on a case-by-case basis are presented below.

Crosslake Telephone Company
Issue: Technology of transmission 40 with maximum advertised download speed in tier 7, lower than expected value range for the technology.
Resolution: Provider representative indicated that DOCSIS 3.0 has been installed, but speeds across their service area have not been bumped up yet. That will occur after the connectivity to fiber backbone is complete and middle-mile bandwidth is increased.

Midcontinent Communications
Issue: Technology of transmission 41 with maximum advertised download speed in tier 8, higher than expected value range for the technology.
Resolution: Provider website advertises 30 Mbps service; screenshot below.

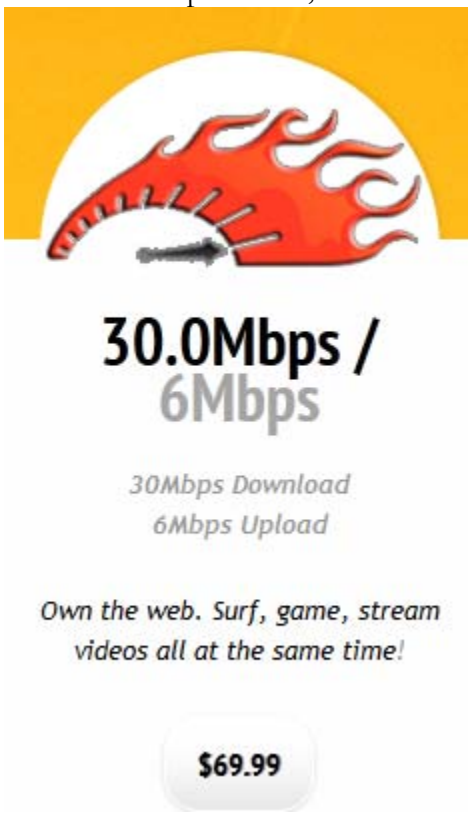


New Ulm Telecom, Inc.
Issue: Technology of transmission 40 with maximum advertised download speed in tier 8, lower than expected value range for the technology.
Resolution: Provider website advertises 25 Mbps; screenshot below.

Internet Pricing

Download speeds up to 1 mbps	$29.95
Download speeds up to 15 mbps	$44.95
Download speeds up to 25 mbps	$64.95

NorthfieldWiFi LLC
Issue: Fixed wireless platform with maximum advertised download speed in tier 8, higher than expected value range for the technology.
Resolution: Provider website advertises 30 Mbps service; screenshot below.



Radio Link Internet
Issue: Fixed wireless platform with maximum advertised download speed in tier 8, higher than expected value range for the technology.
Resolution: Provider website advertises 30 Mbps service; screenshot below.

Monthly **Internet Service Plans**

$10	1.5mbps down / 1.5mbps up (Economy/12month commitment)
$45	5mbps down / 3mbps up
$55	15mbps down / 5mbps up
$65	22mbps down / 7mbps up
$85	30mbps down / 10mbps up

Sjoberg's Inc.
Issue: Technology of transmission 40 with maximum advertised download speed in tier 8, lower than expected value range for the technology.
Resolution: Provider website advertises 40 Mbps service; screenshot below. In addition, provider representative confirmed that 40 Mbps service is available to all customers using DOCSIS 3.0.

Internet Prices & Speeds

Economy- $19.95 with cable - $26.95 without cable - 1 email address, No Web Space 64/down/64 up - **Great Dial up Alternative

Silver - $29.95 with cable - $36.95 without cable – (5 Meg) 5MEG download/256 upload – **

Gold- $39.95 with cable - $46.95 without cable – (8 Meg) 8 MEG download/384 upload – **

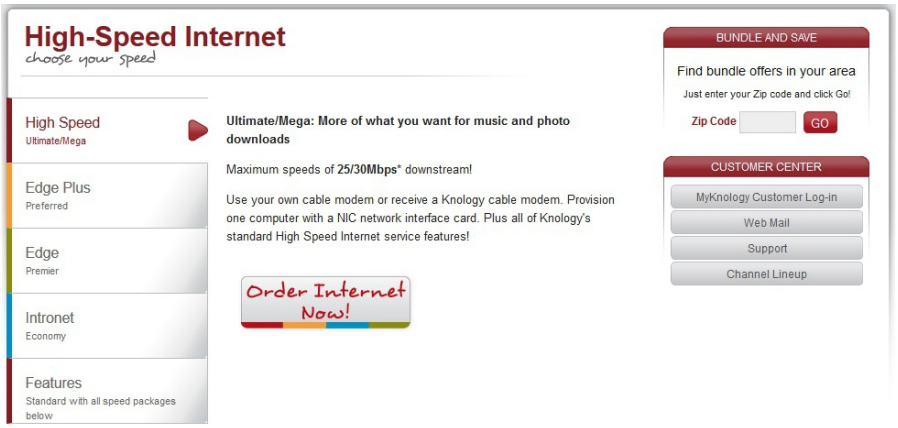
Platinum - $49.95 with cable - $56.95 without cable – (11 Meg) 11 MEG dowload/1024 upload – **

Extreme – $89.95 with cable - $96.95 without cable – (40 Meg) 40 MEG dowload/6 MEG upload – **

Southern Cablevision, Inc.
Issue: Technology of transmission 40 with maximum advertised download speed in tier 7, lower than expected value range for the technology.
Resolution: Provider representative confirmed that service area is DOCSIS 3.0, but lower speeds are still advertised and in use while customers move modems up to DOCSIS 3.0.

WideOpenWest Finance, LLC.
Issue: Technology of transmission code 40 with maximum advertised download speed in tier 8, lower than expected value range for the technology.

Resolution: Provider website advertises 25 Mbps service; screenshot below. Please note that while WOW! acquired Knology, the WOW! website still displays Knology-based web pages for this state's coverage.



Data Submission and Coverage Estimation of Non-Participating Providers (NPP)

As part of its ongoing broadband mapping efforts, CN has developed a series of processes with the goal of submitting coverage estimation mapping data to NTIA for every known and qualifying last-mile broadband provider, regardless of platform type (cable modem, DSL, fixed wireless, etc.). Appendix A presents full reports on the estimated broadband service territory for the providers in this state that have either been non-responsive or that have refused to participate in the SBI mapping initiative as of April 2013. These coverage estimation reports are for non-participating providers whose data has not been previously submitted to NTIA in past mapping cycles.

The section below provides a summary of the status of CN's outreach and findings on all non-participating provider coverage for the April 2013 SBI submission.

Access MN

Coverage for this NPP is being submitted for the first time; please find a white paper on provider outreach and coverage estimation in Appendix A.

AirFiber

Coverage for this NPP is being submitted for the first time; please find a white paper on provider outreach and coverage estimation in Appendix A.

Lakesarea Wireless

Coverage for this NPP is being submitted for the first time; please find a white paper on provider outreach and coverage estimation in Appendix A.

Nate's Net, Inc.
Coverage for this NPP is being submitted for the first time; please find a white paper on provider outreach and coverage estimation in Appendix A.

Nexterra Communications
The coverage estimation for Nexterra Communications was not updated from the previous submission in October 2012. The full white paper containing the most recent coverage estimation for this provider can be found within the October 2012 submission to NTIA.

TotheHome
The coverage estimation for TotheHome was not updated from the previous submission in October 2012. The full white paper containing the most recent coverage estimation for this provider can be found within the October 2012 submission to NTIA.

PROVIDER VALIDATION METHODOLOGY

Broadband providers maintain their service area data in many different formats, all in varying levels of complexity and granularity. In order to ensure that the data required by the NTIA is standardized across all providers and that it is as accurate as possible, CN translates and formats the data that providers are able to supply into a GIS shapefile and produces maps for the provider to review. The resulting map(s) and review process allow for providers to see their service area in a geographic format – for some providers, this is the first time they have seen maps of their broadband service area. Having the mapped service area allows providers to quickly identify any issues that appear in the data representation, whether the issue is in the data translation into a GIS format or from the original data collection and submission. Often data is provided from various sources and through the review and revision process, local engineers who operate the networks and work in the field are able to ensure that the tabular data that has been submitted is accurate and represents the real-world network extent. Any issues in how the service area is represented on the map(s) are remedied by CN, whether they are additions, removal of service, or any other revisions. Revised maps of service area representations are sent to the provider for review and approval; CN will revise data and return maps as many times as necessary until the provider is in agreement that the map represents their service area as accurately as possible. Once the review process has been completed and final approval of the data is provided, the data is deemed ready for NTIA submission.

Once the data collection has been aggregated at a statewide level, static maps of statewide and county-level availability are produced and made publicly available. In addition, consumers can visit the interactive online tool, My ConnectView, to create customized views of broadband service areas and analyze corresponding demographic information. Leveraging broadband service data on various platforms allows for public users, providers, and other stakeholders to review, scrutinize, and provide feedback on the represented data. This feedback becomes a validation method in itself, as consumers submit inquiries to CN either affirming where service is not available or identifying areas where broadband service is shown on the map, but in actuality is not available. This allows for a follow-up to providers regarding revisions to the data as it is represented; it also allows for CN to identify locations where on-site visits may be necessary to complete field validation of available

services. Public feedback on all forms of mapping products serves as a localized validation method for provider-supplied information and allows CN to resolve inaccuracies as they are identified to ensure that only the highest quality information is provided to stakeholders.

Additionally, non-participating provider narratives that were submitted in previous mapping cycles are subjected to the same level of scrutiny. Occasionally, a provider may elect to voluntarily participate (thus eliminating the need for future data estimation activities in the field). However, more often than not, the NPP narrative is updated with a combination of data gleaned from the provider's website, data obtained through FCC research and/or data collected/verified in the field by a CN staff engineer.

Estimates derived from provider-validated data indicate that approximately 1.47 percent of Minnesota households do not have terrestrial fixed broadband service available, and approximately 0.07 percent of Minnesota households have neither mobile nor fixed broadband service available.

Within rural areas of the state, results derived from provider-validated data indicate that approximately 3.40 percent of rural Minnesota households do not have terrestrial fixed broadband service available, and approximately 0.16 percent of rural Minnesota households have neither mobile nor fixed broadband service available. Please note that the availability estimates presented are based on Census 2010 household information.

The estimates above, in accordance with NTIA's definition of available broadband service as specified in the SBI NOFA, include broadband service with download speeds of at least 768 Kbps and upload speeds greater than 200 Kbps.

In addition, due to the nature of the SBI data collection methodology as defined by the NTIA and based on both census block geographic units and street segment data, the estimates of broadband availability derived from provider-validated data may include an overstatement of the actual number of households with broadband availability. Under the census block-based data collection method, a provider will typically report broadband availability for an entire census block whether its network is present across the whole or only a subset of that census block. This potential overestimation at the census block level can be amplified as the data is aggregated across the entire state.

WIRELESS METHODOLOGY

Broadband Service Availability in Provider's Service Area
Wireless Services Not Provided to a Specific Address

Data solicited from a fixed wireless provider to create propagation models include, but are not limited to:

1. The name of the structure.
2. Whether the transmitting device is operational or proposed.
3. The maximum advertised downstream speed, the maximum advertised upstream speed.
4. The typical downstream speed, the typical upstream speed (peak periods for both).

5. The frequency range of spectrum being used (as prescribed by NTIA). This may include (but is not limited to) spectrum authorizations identified within the Federal Communications Commission (FCC) Universal Licensing System (ULS) database or located on the FCC's Spectrum Dashboard. This research often proves to be exceptionally effective when estimating the coverage area of an NPP.
6. The primary population center(s) being served (for geopolitical boundary reference).
7. The physical address of the transmit site (in the event latitude/longitude is unavailable from the provider this allows a quick reference point for geocoding).
8. Latitude in either Degrees, Minutes, and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
9. Longitude in either Degrees, Minutes and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
10. Antenna pattern (e.g. omnidirectional, 180°, 120°, 90°, etc.).
11. Azimuth of antenna (e.g. 360° with magnetic declination if known).
12. Approximate transmit radius (in feet, miles, or kilometers).
13. Polarity of transmit antenna (Vertical or Horizontal).
14. Transmit antenna gain (in dBi).
15. Line loss (applicable only to providers using coax, heliax, waveguide or other forms of cabling – excludes power-over-Ethernet devices).
16. Mechanical and/or Electrical beam tilt (if applicable).
17. Equipment Manufacturer (allows easy cross-reference against manufacturer's specification sheet).
18. Power output of the transmitting device (if unknown, FCC standards or manufacturer specifications are applied).
19. AMSL at base of tower site.
20. Antenna centerline AGL (height of antenna above ground level measured at the centerline of the actual antenna).
21. Foliage factors (Evergreens/Deciduous and percent of ground cover).
22. Ground Clutter (primarily used in rural areas to account for foliage and in metropolitan areas to account for types and heights of buildings if known).
23. Average gain of receive antenna.
24. Receive antenna is estimated at height above average terrain (HAAT) of 6.2 meters/20 feet.
25. Federal Registration Numbers (if applicable) which may allow opportunities to cross-reference and/or obtain additional data from the FCC's ULS and the **CO**mmission **RE**gistration **S**ystem.

Propagation modeling combines scientific data and empirical mathematical formulation for the characterization of radio wave propagation as a function of frequency, distance, and other conditions. Propagation software(s) typically use the Irregular Terrain Model (also known as Longley-Rice) of radio propagation for frequencies between 20 MHz and 20 GHz. This model is

based on electromagnetic theory and statistical analyses of the combination of terrain features and radio measurements, then predicting the median attenuation of a radio signal as a function of distance and the variability of the signal in time and in space. For metropolitan areas, the software can typically be adjusted to use the Okumura-Hata model, which accounts for predicting the behavior of cellular transmissions in areas where buildings are the primary obstructions. The resulting product from either model depicts a graphical illustration of the theoretical propagation characteristics of a selected frequency range based on defined variables (receiver sensitivity of the home/mobile device, foliage factor, and digital elevation terrain input).

After converting propagation models into a geospatial format, additional processing is completed to remove the small pixels representing service present in the resulting dataset. These areas are initially created based on the parameters entered in the software from the provider equipment information, the underlying data parameters of elevation, hill shade, etc., and the limitations of the software itself to display a broadband service area as accurately as possible. Generally, these random pixel striations appear as a result of signal levels reaching the highest elevated points within the prescribed radius. Typically, while this pixilation anomaly shows legitimate areas where signals can be received, these highly elevated points may have exceedingly sparse populations or are entirely void of population. As a result, and congruent to the *Wireless Technology Methodologies and Business Logic* white paper submitted to NTIA on January 20, 2011, all independent pixels representing service that are less than 0.125 square miles in area have been removed from the geospatial representation of each wireless provider.

BROADBAND INQUIRIES METHODOLOGY

CN collects consumer feedback in the form of broadband inquiries (BBIs). These inquiries represent any type of communication received from the public regarding broadband service. Once BBIs are received across the state, this information is overlaid with the broadband availability information which was collected through the SBI program. This allows for a real-world comparison of the broadband landscape to the information received from broadband inquiries. Consumers submitting these inbound comments and/or inquiries are able to provide information regarding five categories: 1) residents who do not have broadband but want it; 2) residents who have broadband but want a different provider; 3) residents who do not have broadband, but the broadband inventory maps indicate that they do; 4) residents who have broadband but want a faster connection speed; and 5) residents who have broadband but want a less expensive service option.

BBIs are submitted frequently by consumers via the Connect Minnesota website. Inquiries often seek help to identify local broadband provider options, or to learn when a specific provider may be able to provide service to that consumer. Consumer comments also provide information which may help modify maps with actual service area information. The primary objectives of CN regarding these inquiries are 1) to improve the accuracy of the state maps with submitted consumer information and follow-up field research; 2) to provide broadband options to consumers through cooperation with mapped providers and by facilitating new broadband service options; and 3) to map and analyze information from consumers about areas of unmet broadband demand and alternatives to currently mapped services. A prime example of the second option is the utilization of

the Rural Utility Service satellite eligibility tool. By simply entering the consumer's address, the CN engineer can quickly determine if the consumer meets the initial qualification status for BIP satellite subsidies.

New BBIs are assigned to either the GIS department or the Engineering & Technical Services (ETS) team depending on the category entered by the consumer on the website submission form. The GIS or ETS team members respond to each inquiry according to the information entered by the consumer. Many BBIs can be resolved through desktop research; however, if a BBI requires research in the field, the assigned ETS team member conducts such research when performing field validations in the area of the inquiry, or at another such time as is practical and appropriate. GIS and ETS team members respond to and conclude BBIs via telephone contact and/or e-mail communication.

The broadband inquiry process has been implemented in each of the CN state programs with successful results. Altogether CN has received over 18,839 broadband inquiries since 2007, allowing the state programs to evaluate each inquiry for broadband demand and data verification. These inquiries are continuously examined against current broadband availability, updated every six months, to determine if previously unserved households have been expanded to and can now receive broadband at their residence. This database of broadband inquiries has also allowed the CN state programs to aggregate demand in concentrated areas to show providers the exact locations where the population has made it clear that they would purchase broadband if it was made available to them. Providers in the states have responded to this process and have expanded to areas knowing that their investment will be worthwhile. Data verification methods have also proven successful, as the state programs have been able to show those inquiries that indicate the broadband service areas are misrepresented on the map to providers, who then verify where service cannot reach in regard to that residence(s). The broadband coverage in these states has been altered to create a more accurate map based on the inquiries submitted by the public.

During this reporting period, the Connect Minnesota project has received a total of 9 inquiries (178 grant inception to date). As more inquiries are submitted to Connect Minnesota, a more thorough validation of the broadband landscape can be performed, while also allowing providers to see which areas have a high demand for broadband adoption.

My ConnectView Methodology

My ConnectView is an interactive online mapping tool for viewing, analyzing, and validating broadband data. Developed using Esri's ArcGIS for Server and Adobe's Flex Framework and hosted and maintained by Connected Nation, My ConnectView is a multi-functional, user-friendly way for local leaders, policymakers, consumers, and technology providers to devise a plan for the expansion and adoption of broadband.

First and foremost, My ConnectView allows consumers to locate their residence and identify providers that offer broadband Internet service to that location. The interactive platform allows for users to build and evaluate broadband expansion scenarios using a wealth of data, including several

coverage analysis layers, speed analyses, Community Anchor Institutions, and tools to search and export household demographic information, as well as extract data in GIS, spreadsheet, and/or PDF formats.

My ConnectView also features more interactive data layers and additional tools than ever before to allow the consumer to explore the broadband data. My ConnectView provides consumers with the ability to print, e-mail, and provide feedback on the broadband data displayed on the interactive map. Through the collection of this feedback, a visual demand for broadband is presented. This visualization allows the CN state programs the ability to validate the broadband availability for accuracy. If residents within a region state they are without broadband, but the interactive map shows otherwise, this allows CN to approach the providers within that area in an effort to trim down their coverage to more accurately represent real-world availability on the ground.

The Connect Minnesota project launched My ConnectView on April 2, 2012, and has received 1,926 visits this reporting period; to date the interactive mapping application has received 7,266 visits.

SPEED TEST METHODOLOGY

The 1,346 speed tests that are represented in the Connect Minnesota Speed Test Report during this reporting period (12,866 grant inception to date) are the result of a partnership between CN and Ookla Net Metrics. Utilizing this relationship increases the level of confidence in the data being collected and provides for a far greater sample size than could be collected by a single testing site.

Ookla owns and operates Speedtest.net, as well as develops and deploys speed tests, such as the Connect Minnesota speed test website, for partners around the world. This network of sites that is developed and run on its testing technology provides Ookla with a vast dataset that, due to the variability of geographic information collected across the varying speed test sites, is geocoded utilizing Geo-IP technology. This technology allows for tests to be geocoded to points of aggregation, typically larger nodes across provider networks. While there are hundreds of thousands of tests that have been conducted, the level of aggregation is only sufficient for county-level detail due to the test results being located at these larger nodes and not at an absolute location for each speed test.

In an effort to validate broadband data from the Connect Minnesota project, speed test information is collected throughout the state. Speed tests provide speed information on the path taken through all networks (a provider's network as well as additional networks) a local machine must connect to in order to reach the host test. The benefit of this collection of speed information is two-tiered. First, it allows for a comprehensive dataset of speeds, while also providing Connect Minnesota with the information on where broadband services are available. Second, unlike theoretical speed information which may be received through the data collection process, the use of speed tests provide real-world information on the speeds that currently exist within the state of Minnesota.

Providers Deemed Non-Viable

The following list of companies represents the remainder of the broadband provider universe that was originally identified as complete for outreach to begin for the State Broadband Initiative. These providers are not included in the Data Package for the April 2013 submission because they have been deemed non-eligible under the parameters and guidance of the SBI grant program. This list of companies includes, but is not limited to: providers offering service but below the current definition of broadband, those that have gone out of business, technology consulting firms, infrastructure or network construction companies, non-facilities based general resellers, etc.

	Company Name	URL	Comments
1	360networks	http://www.360networks.com/	Acquired by another company.
2	Access Media 3, Inc.	http://www.am3inc.com	Company is a bulk reseller to MDU and commercial properties.
3	Airespring, Inc.	http://www.airespring.com	Company is a nonfacilities-based reseller.
4	Akeva	n/a	Reseller of Verizon Mobile phones in mall kiosk.
5	Arrowhead Electric Cooperative, Inc.	http://www.aecimn.com/	Construction is underway; may need to indicate provider viable for October 2013 Submission.
6	Boreal Access	http://boreal.org/drupal/	Provider does not meet minimum speed requirements for participation.
7	Broadcore, Inc.	www.broadcore.com/	Broadcore is a national provider of business-class hosted unified communications services and has no ISP offerings.
8	BullsEye Telecom, Inc.	http://www.bullseyetelecom.com	Company is a nonfacilities-based reseller.
9	Carver County Fiber Initiative	www.co.carver.mn.us	Provider continues to be on schedule to go live with project prior to our required project completion date of July 31, 2013. They are tentatively planning to go live with the school entities in March 2013, with the remainder of the entities, which includes the county, cities, townships and other entities, in May 2013.

10	Cbeyond Communications, LLC	http://www.cbeyond.net/index.htm	Cbeyond is a national provider of business-class hosted unified communications services and has no ISP offerings.
11	City of Bagley	http://www.bagleymn.us/	Cable system does not offer Internet service currently. City has accepted RFP to get their HFC Plant upgrade to include ISP services. Completion expected Summer 2013.
12	Cloudnet Inc.	http://www.cloudnet.com	Nonfacilities-based reseller for DSL services and wireless coverage upgraded to meet minimum speed requirements. Will make viable October 2013 Submission to determine Fixed wireless status.
13	Computer Pro Inc.	www.hickorytech.com	Company reporting data is provided by Hickory Tech.
14	Delavan Telephone Company	http://www.bevcomm.net/	Company reporting data is provided by Blue Earth Valley Telephone Company (BEVCOMM).
15	Digital Telecommunications, Inc.	http://www.pickdti.com/	No longer in business.
16	Dunnell Telephone Company	http://bevcomm.net/	Provider does not meet minimum speed requirements for participation.
17	EN-TEL Communications, LLC	http://www.en-tel.com/	Acquired by another company.
18	Enventis Telecom, Inc.	http://www.enventis.com/	Provider does not offer broadband in Minnesota.
19	Global Crossing Telecommunications, Inc.	http://www.globalcrossing.com/	Acquired by another company.
20	GN Wireless	n/a	Local phone disconnected and website not located; provider no longer in business.
21	Home Telephone Company	http://www.hmtel.com	Company reporting data is provided by Arvig Communications Services.
22	Lake County Fiber Network d.b.a. Lake Connections	http://www.co.lake.mn.us/	Phase 1 consists of 75 miles of fiber constructed in the towns of Two Harbors and Silver Bay. Construction began in June of 2012 and completion is expected by second quarter of 2013.

23	Lakedale LINK	http://www.lakedaletelephone.com/	Acquired by another company.
24	Lakedale Telephone	http://www.lakedaletelephone.com/	Acquired by another company.
25	LightEdge Solutions, Inc.	http://www.lightedge.com	Provider does not offer residential broadband service in Minnesota.
26	Lightyear Network Solutions, LLC	www.lightyear.net	Nonfacilities-based reseller for DSL services.
27	Lowry Telephone LLC	www.home.runestone.net/rta	Company acquired by Runestone Telecom Association.
28	Maple Leaf Networks	http://www.mleaf.net/	No longer in business.
29	Merit Network, Inc.	www.merit.edu	Provider has operations in Michigan; no operations in MN completed to date.
30	Metropolitan Telecommunications Holding Company	n/a	Nonfacilities-based reseller for DSL services.
31	MLM Project Services, Inc.	http://www.mlmpsinc.com	Company does not offer residential broadband service in Minnesota.
32	M-Tek Systems	www.mteksystems.com	Company does not offer residential broadband service in Minnesota.
33	New Edge Network, Inc.	http://www.newedgenetworks.com/	Nonfacilities-based backhaul reseller.
34	North American Communications Corp (NACC)	http://www.jaguarcommunications.com	Maps and data are supplied by d.b.a.Jaguar Communications.
35	Northeast Service Cooperative	http://www.nesc.k12.mn.us/	Middle mile fiber construction is underway; expect data for October 2013 submission.
36	OrbitCom, Inc.	http://www.orbitcom.biz	Reseller of CenturyLink Services and has been non-responsive to multiple contact attempts.
37	PAETEC Communications, Inc.	http://www.paetec.com/	Acquired by another company.
38	Popp.com, Inc.	http://www.popp.com/	Provider is a supplier of business services only.

39	Reliance Globalcom Services, Inc.	http://www.relianceglobalcom.com/	Wholesale reseller of backhaul and managed B2B circuits.
40	Renville-Sibley Fiber to the Farm	http://www.scfiber.com	Fiber to the Farm project still seeking funding.
41	Ridge Runner Internet Services Inc.	http://www.ridge-runner.com/index.html	No longer in business.
42	Sihope Communications	http://www.sihope.com/	Facilities-based company offering B2B solutions and reseller of circuits (non-residential).
43	Sioux Valley Rural Television, Inc.	n/a	Company does not offer broadband services; affiliate Sioux Valley Wireless coverage and data is provided.
44	St. Olaf College Telecommunications	http://www.stolaftelephone.com/	Company offers Business broadband services.
45	Tekstar Communication Systems, Inc.	n/a	Company reporting data is provided by Arvig Communications Services.
46	Telefonica USA, Inc.	http://www.us.telefonica.com/	Provider does not offer services in Minnesota.
47	Terril Telephone Cooperative	http://www.terril.com	Provider does not offer services in Minnesota.
48	The City of Boyd, Minnesota	n/a	The City of Boyd offers cable television only over cable plant; leases cable spectrum to ISP, MVTV Wireless.
49	United States Cellular Corporation	http://www.uscellular.com/uscellular/index.jsp	Provider does not offer broadband services in Minnesota.
50	University Corporation for Advanced Internet Development	n/a	Nationwide Gbit network for anchor institutions; under construction utilizing existing fiber and new installations.
51	US Cable Corporation	http://www.uscablegroup.com/	Acquired by another company.
52	US Family Internet	http://www.usfamily.net/	Nonfacilities-based reseller of CenturyLink Services.
53	US Internet of Minnetonka	http://www.usiwireless.com/	Provider coverage and data is reported by d.b.a. USI Wireless.
54	Velocity Telephone, Inc.	http://www.velocitytelephone.com	Nonfacilities-based reseller of CenturyLink Services.

55	WilTel Communications, LLC.	n/a	As of December 23, 2005, WilTel Communications Group Inc. operates as a subsidiary of Level 3.

Appendix A: Estimation of Non-Participating Providers

AccessMN

AirFiber

Lakesarea Wireless

Nate's Net

ACCESS BROADBAND

As part of its ongoing broadband mapping efforts, Connected Nation (CN) has developed a series of processes with the goal of submitting mapping data to NTIA for every known and qualifying broadband provider, regardless of whether the provider has chosen to support and participate in the State Broadband Initiative (SBI) mapping program.

The following narrative provides detail regarding the recent data collection activities related to Access Broadband (dba AccessMN), a wireless Internet service provider (WISP), located in Virginia, Minnesota, with a service area around Virginia, Ely, and Cook, Minnesota. The narrative will include information regarding how and where CN obtained publicly available data and the on-the-ground due diligence, verification, and validation techniques that support the underlying data.

Background

CN staff members have continued trying to obtain the participation of the provider with 32 instances of communication via telephone and e-mail sessions since August 3, 2010 through January 31, 2013. On numerous occasions, most recently on December 17, 2012, a company representative responded indicating that the provider was electing not to provide data. Additionally, a CN staff member visited the Access Broadband office on October 16, 2012, to discuss the broadband mapping project in person with Access Broadband staff. However, upon arrival the CN staff member was informed that the contact person was unavailable.

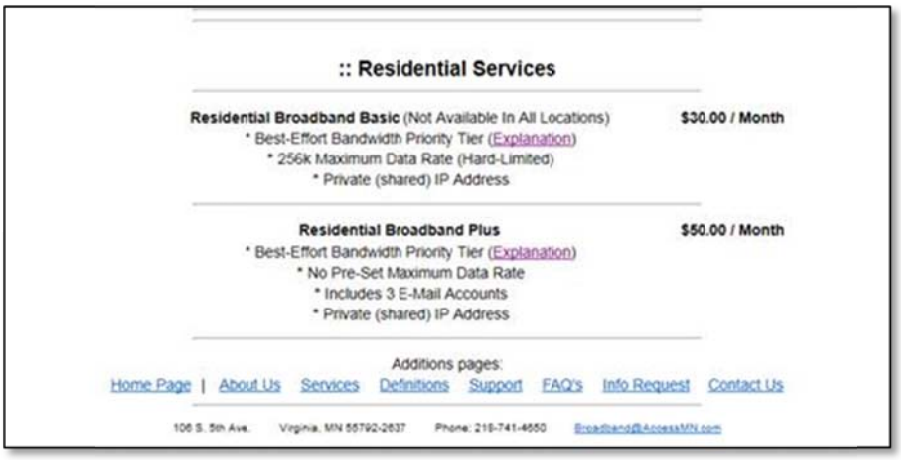
The Issue

Access Broadband, by its lack of responsiveness since August 3, 2010, has predicated its unwillingness to participate in the Connect Minnesota broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN began building a file based on research information and, as time progressed, enriched the file with information obtained through the public domain. For example, CN reviewed the provider's website (http://www.accessmn.com/) to determine the residential service plans **(Exhibit A)** and the service area **(Exhibit B)** of the provider's wireless network. A search for a Federal Registration Number (FRN) on the FCC **CO**mmission **RE**gistration **S**ystem (CORES) system yielded an FRN of 0012188371 **(Exhibit C)** with contact information relative to the owner of the company. Also, to support field validation of access points, the FRN was referenced against the FCC Universal Licensing System (ULS) to identify any authorizations the provider may hold for licensed frequencies within the service area. This process yielded a 3,650-3,700 MHz authorization for Station WQS569 **(Exhibit D)** with 0 unique locations.

Exhibit A: Service Plans



:: Residential Services

Residential Broadband Basic (Not Available In All Locations) **$30.00 / Month**
* Best-Effort Bandwidth Priority Tier (Explanation)
* 256k Maximum Data Rate (Hard-Limited)
* Private (shared) IP Address

Residential Broadband Plus **$50.00 / Month**
* Best-Effort Bandwidth Priority Tier (Explanation)
* No Pre-Set Maximum Data Rate
* Includes 3 E-Mail Accounts
* Private (shared) IP Address

Additions pages:
Home Page | About Us Services Definitions Support FAQ's Info Request Contact Us

106 S. 5th Ave. Virginia, MN 55792-2637 Phone: 218-741-4650 Broadband@AccessMN.com

Exhibit B: Service Area

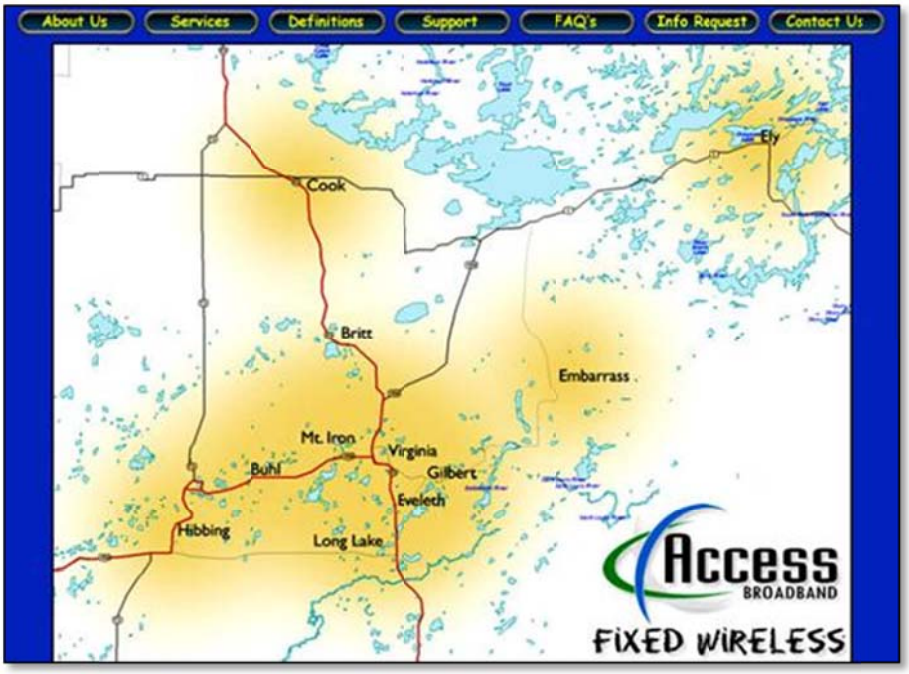


Exhibit C: Federal Registration Number

Registration Detail	
FRN:	0012188371
Registration Date:	11/22/2004 06:58:20 PM
Last Updated:	10/10/2011 09:32:00 PM
Business Name:	Access Equipment & Communications, Inc.
Business Type:	Private Sector , Corporation
Contact Organization:	Access Broadband
Contact Position:	President
Contact Name:	Jim Nyhus
Contact Address:	106 South 5th Ave Virginia, MN 55792 United States
Contact Email:	jim@accessmn.com
ContactPhone:	(218) 741-4650
ContactFax:	

Exhibit D: WQOS569 License Reference

Specified Search

FRN like **0012188371**

Matches **1 - 1** (of **1**)

PA = Pending Application(s)
TP = Termination Pending
L = Lease

Page 1

	CallSign/Lease ID	Name	FRN	Radio Service	Status	Expiration Date
1	WQOS569	Access Equipment & Communications, Inc	0012188371	NN	Active	01/18/2022

CallSign/Lease ID	Name	FRN	Radio Service	Status	Expiration Date

Page 1

MAIN | ADMIN | LOCATIONS

Call Sign	WQOS569	Radio Service	NN · 3650-3700 MHz

0 Total Locations
10 Locations per Summary Page

No Locations

0 Total Locations
10 Locations per Summary Page

<u>Preliminary Identification of Provider's Coverage Area</u>

CN staff members extracted the Access Broadband service area map from the provider's website which was then utilized to create a Google Earth image overlay **(Exhibit E).** The image overlay was positioned to match the Google Earth base map's roadways, county boundaries, and water bodies. The degree of accuracy of the image overlay was maintained at less than .25 mile (1,320 ft.) to establish a minimum search criteria of a given wireless transmit site. The provider's service area depiction is represented by shaded areas as shown in **Exhibit B**. The image overlay was created as toll for potential identification of transmit facility coordinates. The image overlay was aligned in Google Earth and examined utilizing the zoom option of the aerial imagery. This provided a means

of establishing coordinates for the search rings of the wireless transmit site access point locations. All locations were entered into Microsoft *Streets & Trips* mapping application **(Exhibit F)** to develop a route for the validation process.

Exhibit E: Google Earth: Access Broadband's Service Area Image Overlay

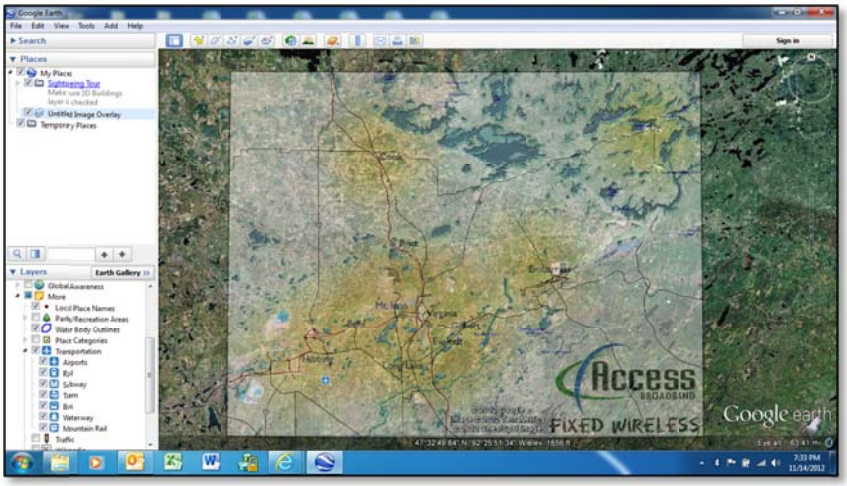
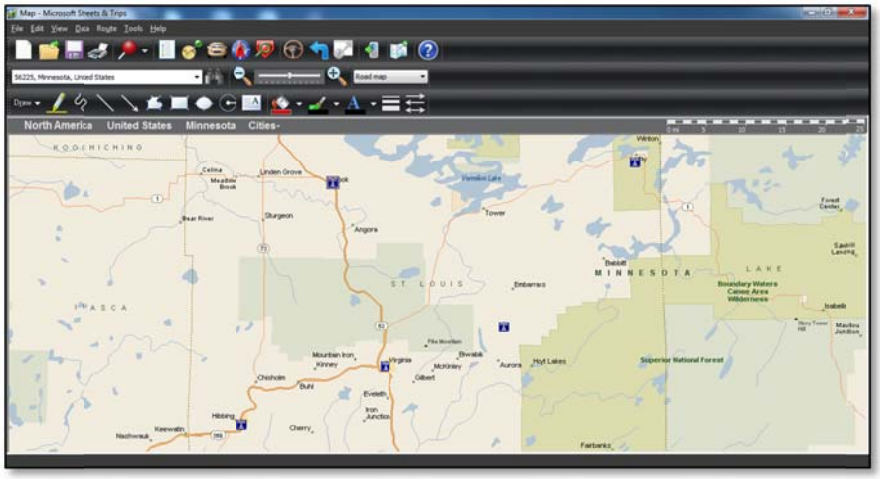


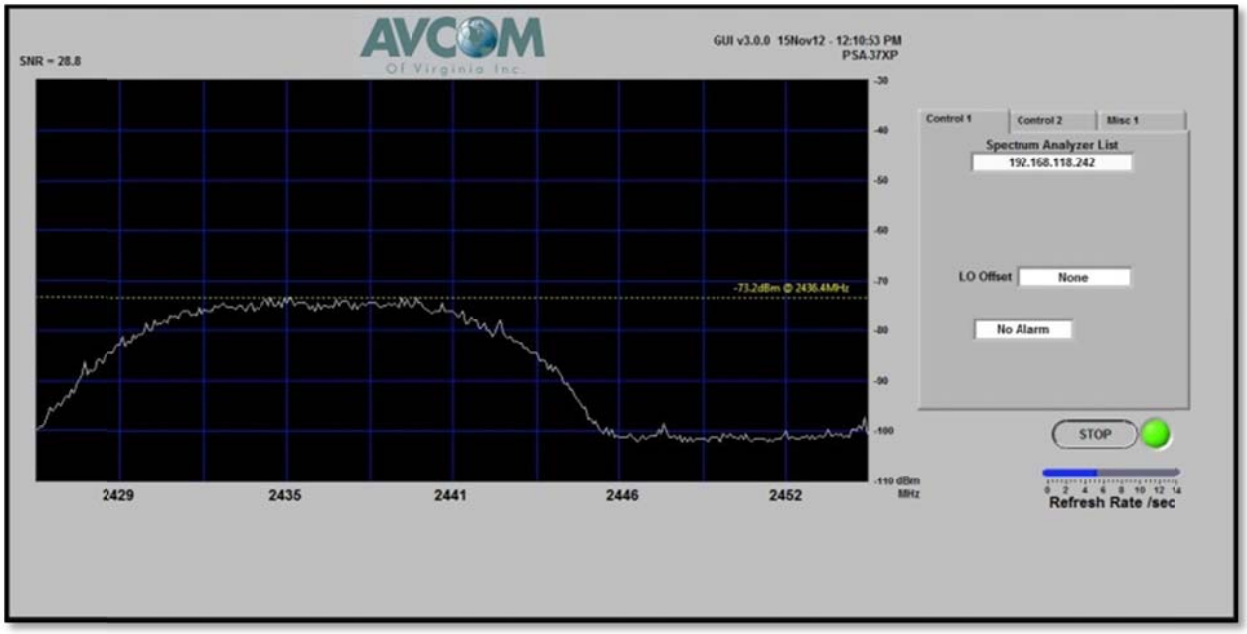
Exhibit F: Validation Points for AP Structures

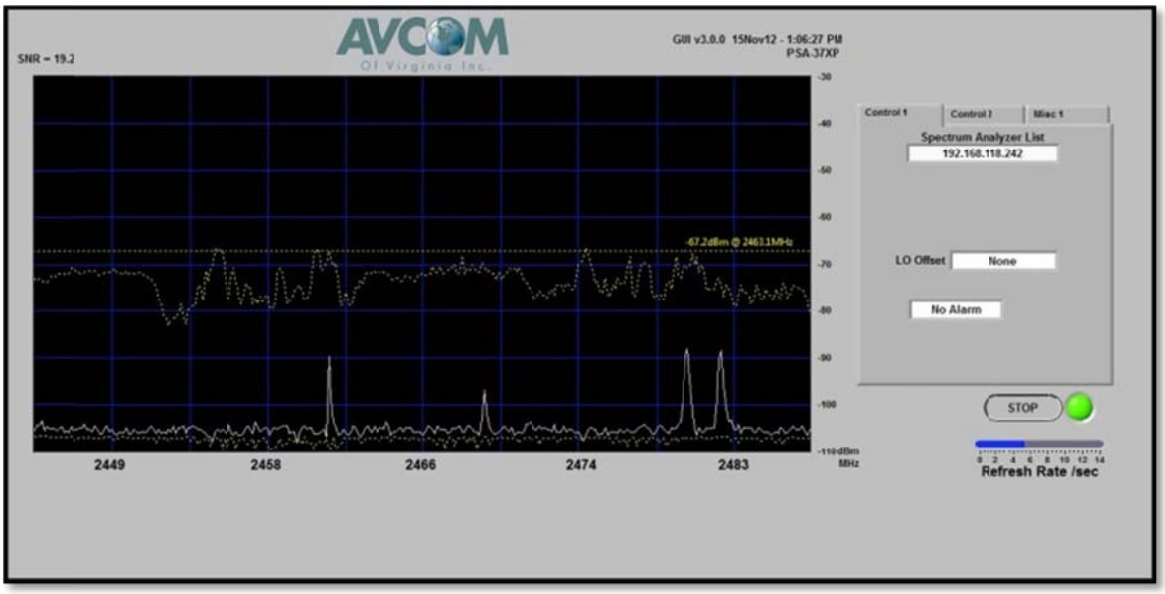


Testing Techniques

CN staff developed a site validation route based on data established with the Google Earth image overlay. The CN wireless engineer that was dispatched into the field to gather, verify, and validate data for this provider, was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands **(Exhibit G)**. Each validation point was scrutinized for frequency of operation. A screen image of the operating frequency (or frequencies) was captured; general notes were recorded for each location-approximate antenna height, frequency of operation, antenna type (omnidirectional or sectored) and photographs were taken of the access points.

Exhibit G: Field Data for Access Broadband Office/Hub Location




AVCOM
Of Virginia Inc.
GUI v3.0.0 15Nov12 - 1:06:27 PM
PSA-37XP
SNR = 19.2
-30
-40
-50
-60
-70
-80
-90
-100
-110dBm
MHz
2449
2458
2466
2474
2483
Control 1
Control 2
Misc 1
Spectrum Analyzer List
192.168.118.242
LO Offset
None
No Alarm
STOP
Refresh Rate /sec


Access
BROADBAND

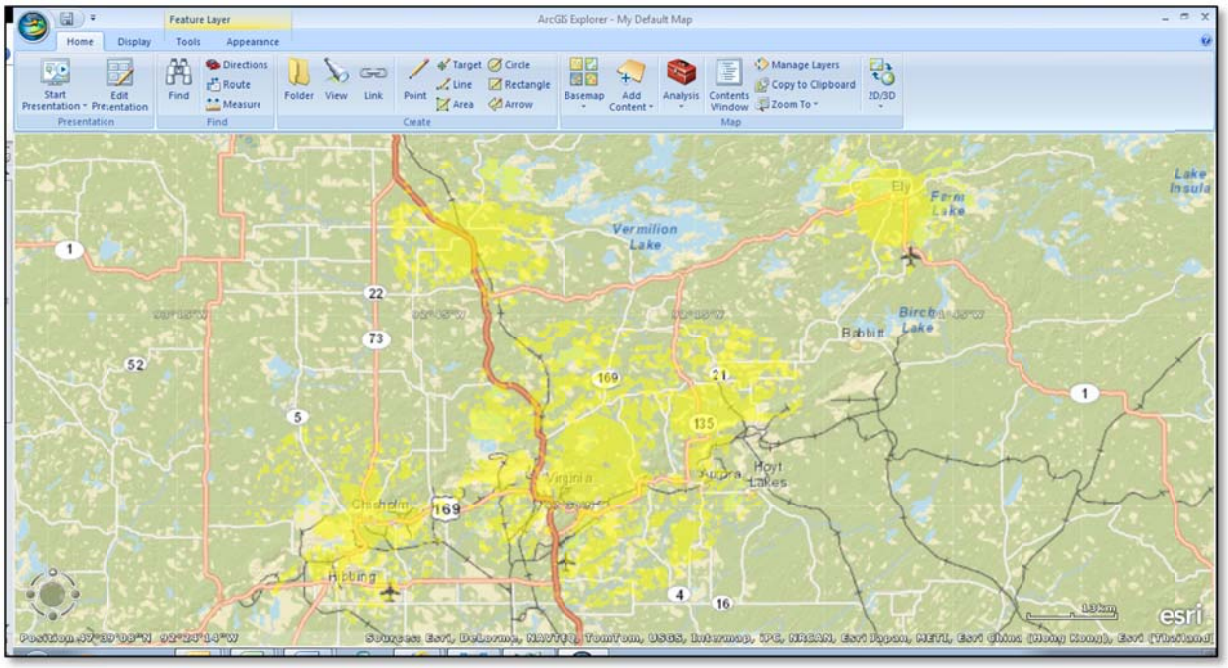
Results and Submission for April 2013

Of the seven locations visited during the validation point route, five access points were identified and relative information was logged into the Access Broadband field validation notes file **(Exhibit H)**. The field notes and the publicly available data were transferred to the Connected Nation Provider Information file. A composite propagation study was completed based on the field data **(Exhibit I)**. Both documents were forwarded to Access Broadband who was advised the information will be submitted to Connect Minnesota and the NTIA broadband mapping project for processing if there are no discrepancies of the estimated coverage received from the provider within a 48-hour period. No response has been received to date.

Exhibit H: Field Validation Notes

Provider	City	Latitude	Longitude	Freq	Structure	Ant Height	Notes:
Access MN	Aurora	47.5928	-92.2238	2435	Tower	150	Balance was Mobile wireless. 150' sectors
AccessMN	Ely	47.8904	-91.8672	2455	Tower	200	Tower site Only in Area 200 foot omni
Access MN	Cook	47.8528	-92.6851	3660	Watertower	140	3650 found not registered in database. City Watertank 150 sectors
Access MN	Virginia	47.5204	-92.5427	3651	Watertower	150	3650 found not registered in database. 150 Watertank sectors
Access MN	Hibbing	47.4136	-92.9246	2450	Watertower	180	Watertank 180' Omni
AccessMN	Virginia	47.522778	-92.5383		Building	35	Office antenna Downtown office
AccessMN	Virginia	47.5119	-92.5327		Building	20	CPE antenna near critter pet clinic

Exhibit I: Access Broadband Composite Coverage



AIRFIBER

As part of its ongoing broadband mapping efforts, Connected Nation (CN) has developed a series of processes with the goal of submitting mapping data to NTIA for every known and qualifying last-mile broadband provider, regardless of whether the provider has chosen to support and participate in the State Broadband Initiative (SBI) mapping program.

The following narrative provides detail regarding the recent data collection activities related to AirFiber, a wireless Internet service provider (WISP), located in Superior, Wisconsin with service area around Duluth, Minnesota. The narrative will include information regarding how and where CN obtained publicly available data and the on-the-ground due diligence, verification, and validation techniques that support the underlying data.

Background

CN staff members have continued trying to obtain the participation of the provider with seven instances of communication via telephone and e-mail sessions since September 24, 2012, through February 26, 2013. Only one communication reply was received from a company representative on September 24, 2012, with verification of operation and speeds offered. However the provider indicated that it was electing not to participate in the process. Additionally, a CN staff member visited the AirFiber office on October 14, 2012, to discuss the broadband mapping project in person with AirFiber staff, but the office was closed upon arrival, despite the fact that this was during normal business hours.

The Issue

AirFiber, by its lack of responsiveness since September 24, 2012, has predicated its unwillingness to participate in the Connect Minnesota broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN began building a file based on research information, and as time progressed, enriched the file with information obtained through the public domain. For example, CN reviewed the provider's website (http://myairfiber.com/) to determine the residential service plans **(Exhibit A)** and the service area **(Exhibit B)** of the provider's wireless network. A search for a Federal Registration Number (FRN) on the FCC **CO**mmission **RE**gistration **S**ystem (CORES) system yielded an FRN of 0021295308 **(Exhibit C)** with contact information relative to the owner of the company. Also, to support field validation of wireless transmit sites and access points, the FRN was referenced against the FCC Universal Licensing System (ULS) to identify any licenses the provider may hold which could possibly enhance locating active access points for the service area. This process yielded no results.

Exhibit A: Service Plans

AirFiber™ delivers true broadband speeds AND saves you money !

- ✓ No data limits or overage charges
- ✓ No hidden "equipment" charges or rentals
- ✓ Plans starting under $30.00/month
- ✓ Locally Serviced and Supported
- ✓ No loss of signal during rain/snow/cloudy days

Service Plans	Monthly Rate	Installation Cost
10 Mbps	$49.95/Month	FREE Installation /w 12 mo. Commitment
7 Mbps	$44.95/Month	FREE Installation /w 12 mo. Commitment
5 Mbps	$39.95/Month	FREE Installation /w 12 mo. Commitment
3 Mbps	$32.95/Month	FREE Installation /w 12 mo. Commitment
2 Mbps	$29.95/Month	FREE Installation /w 12 mo. Commitment

*All customers require an AirFiber Wireless Modem to obtain quality internet and speeds. The 2 Mbps plan is perfect for the casual internet user for online gaming, social apps, email, and casual surfing. Signing up for service is not a guarantee of service, service is not established until installed by AirFiber tech and minimum requirements are met to establish quality service for each individual customer.

Exhibit B: Service Area

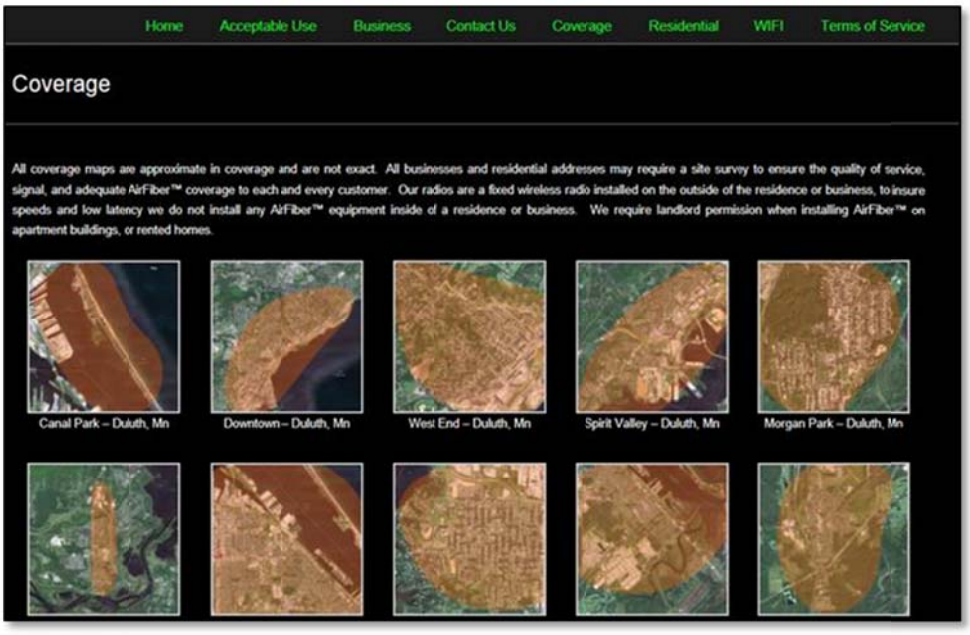


Exhibit C: Federal Registration Number

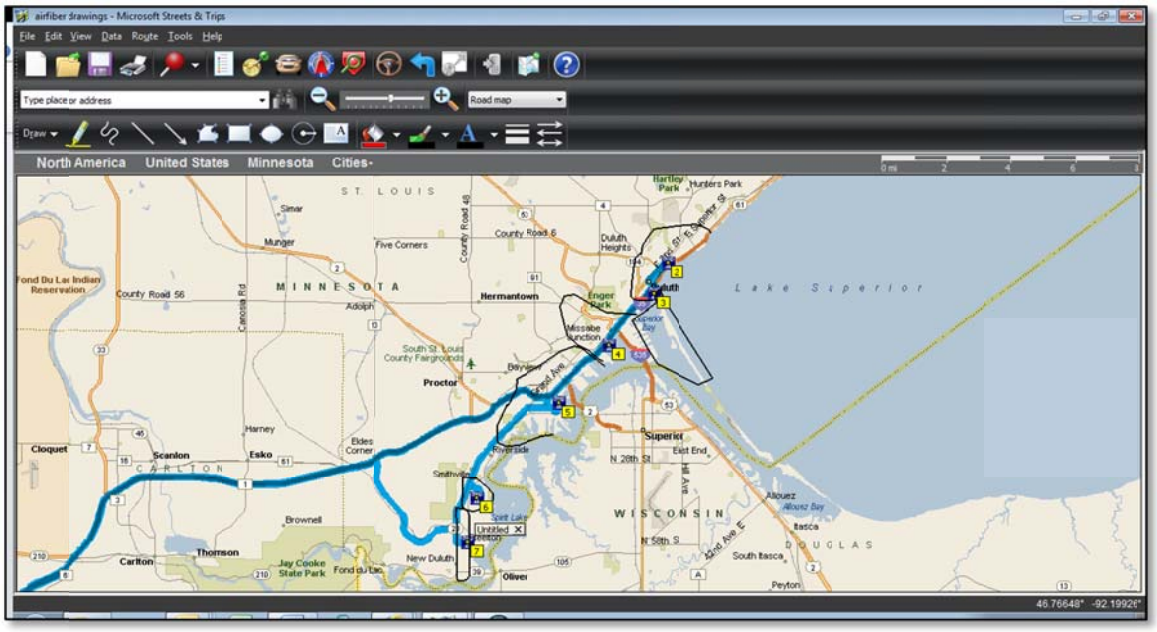
Registration Detail	
FRN:	0021295308
Registration Date:	11/16/2011 12:45:00 PM
Last Updated:	
Business Name:	AirFiber
Business Type:	Private Sector , Limited Liability Corporation
Contact Organization:	
Contact Position:	Director Network Services
Contact Name:	Mr shawn l hanson
Contact Address:	1910 N 54th st Superior, WI 54880 United States
Contact Email:	shawn@myairfiber.com
ContactPhone:	(715) 394-6492
ContactFax:	

Preliminary Identification of Provider's Coverage Area

Connected Nation extracted the AirFiber service area map's from the provider's website and utilized the image to create a Google Earth image overlay **(Exhibit D).** The image overlay was positioned to match the Google Earth base map's roadways, county boundaries, and water bodies. The degree of accuracy of the image overlay was maintained at less than .25 mile (1320 ft.) to establish a minimum search criteria of a given transmit site and/or wireless access point. The provider's service area depiction is represented by shaded areas is shown in Exhibit B and cross hatched in larger scale on Exhibit D. Using the road layers as an accuracy validation tool of the image overlay, additional research was conducted to determine the feasibility of utilizing the shaded areas for identifying coordinates of the six locations identified on the provider's website. The six shaded coverage images were inputted into Google Earth and examined in detail utilizing the zoom option of the aerial imagery. Three locations structures were immediately identified. This provided a means of establishing coordinates for the remaining wireless access point locations. All six proposed locations then were entered into Microsoft *Streets & Trips* mapping application **(Exhibit E)** to develop a route for the validation process.

Exhibit D: Google Earth AirFiber's Service Area Image Overlay

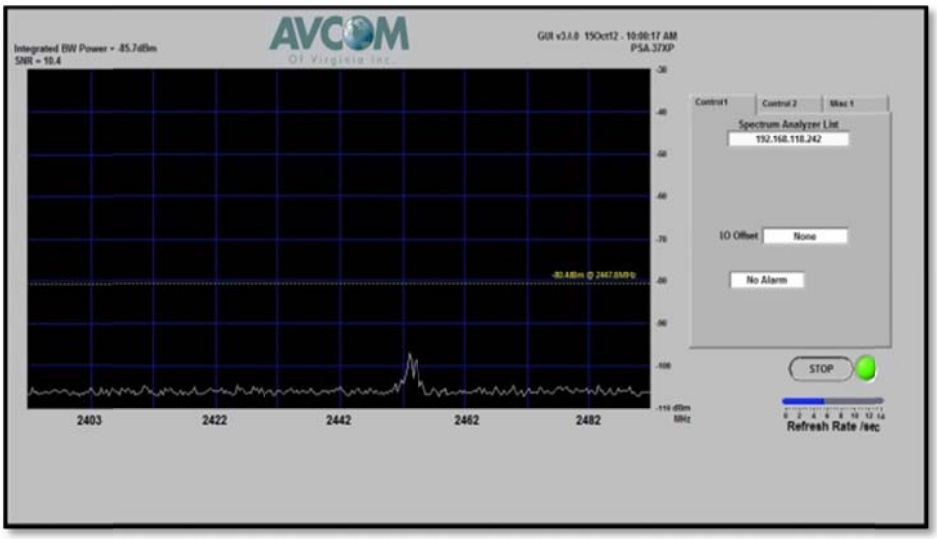
Exhibit E: Validation Points for AP Structures

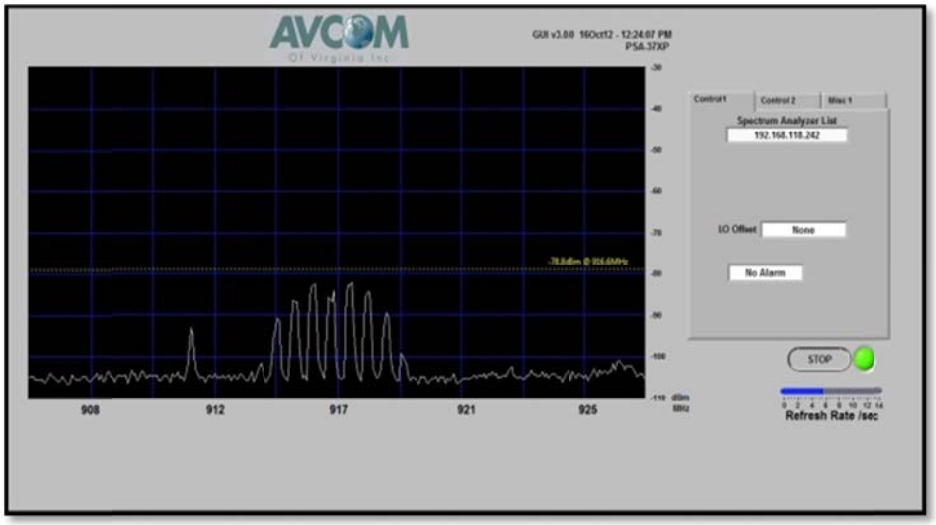


Testing Techniques

Connected Nation staff developed a site validation route based on data established from the Google Earth image overlay. The CN wireless engineer was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands **(Exhibit F)**. Each validation point was scrutinized for frequency of operation. A screen image of the operating frequency (or frequencies) was captured; general notes were recorded for each location-approximate antenna height, frequency of operation, antenna type (omnidirectional or sectored) and photographs were taken of the access points.

Exhibit F: Field Data for AirFiber Office/Hub Location





Results and Submission for April 2013

Of the eight locations visited during the validation point route, six access points were identified and relative information was logged into the AirFiber field validation notes file **(Exhibit G)**. The field and the publicly available data were transferred to the Connected Nation provider information file. A composite propagation study was completed based on the field data **(Exhibit H)**. Both documents were forwarded to AirFiber and the provider was advised the information would be submitted to Connect Minnesota and the NTIA broadband mapping project for processing unless the provider contacted CN within 48 hours to report or discuss any discrepancies of the estimated coverage area. As of this report, no response has been received.

Exhibit G: Field Validation Notes

Name of Access Point/Transmission Location:	Decimal Degree Conversion (automatically converted here if you completed columns K, L and M)	Decimal Degree Conversion (automatically converted here if you completed columns O, P	Type of Sector Antenna Used (enter 360 for an Omni; others = 60, 90, 120, 180, etc.).	Transmit Radius (in miles)	Transmit Frequency (2400 MHz)	Transmit Frequency (5800 MHz)	Transmit Frequency (900 MHz)	Antenna Elevation (feet above ground)
GaryDuluth	46.670810	-92.219500	180	1.0	yes	No	No	60
Canalpark	46.783370	-92.096670	60		No	Yes	Yes	80
DowntownDuluth	46.811290	-92.097180	180		No	Yes	Yes	80
Morgan Park	46.690980	-92.213290	Omni		yes	No	No	60
Spirit Valley	46.733900	-92.158690	Omni		No	Yes	No	80
Westend	46.759550	-92.126520	60	2.0	yes	No	No	80

Exhibit H: AirFiber Composite Coverage

LAKESAREA WIRELESS

As part of its ongoing broadband mapping efforts, Connected Nation (CN) has developed a series of processes with the goal of submitting mapping data to NTIA for every known and qualifying last-mile broadband provider, regardless of whether the provider has chosen to support and participate in the State Broadband Initiative (SBI) mapping program.

The following narrative provides detail regarding the recent data collection activities related to Lakesarea Wireless (LW) a wireless Internet service provider (WISP), located in Duluth, Minnesota, with a service area around Duluth. The narrative will include information regarding how and where CN obtained publicly available data and the on-the-ground due diligence, verification and validation techniques that support the underlying data.

Background

CN staff members have continued trying to obtain the participation of the provider with 7 instances of communication via telephone and e-mail sessions since October 17, 2012, through February 22 2013. Only one communication reply was received from a company representative on January 22, 2013, with a response of electing not to participate due to time constraints. Additionally, a CN staff member visited the LW office on October 31, 2012, to discuss the broadband mapping project in person with LW staff but meeting was terminated due to network outage.

The Issue

LW, by its lack of responsiveness since February 22, 2013, has predicated its unwillingness to participate in the Connect Minnesota broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN began building a file based on research information and, as time progressed, enriched the file with information obtained through the public domain. For example, CN reviewed the provider's website (www.lakesareawireless.com[1]) to determine the residential service plans **(Exhibit A)** and the service area **(Exhibit B)** of the provider's wireless network. A search for a Federal Registration Number (FRN) on the FCC **CO**mmission **RE**gistration **S**ystem (CORES) system yielded no FRN so contact information relative to the owner of the company was located on Manta **(Exhibit C)**.

[1] This website was no longer active as of March 4, 2013.

Exhibit A: Service Plans

Wireless Internet Access Pricing

Service Type:

Consumer Class (2.4, 5.8 Ghz and 900Mhz)

Consumer class is recommended for standard home or small business use. Speeds range from 1.5mb to 10 Mb burstable depending on network usage and signal strength.

Carrier Class (2.4, 5.8Ghz and 900Mhz).

Carrier Class is recommended for larger businesses or individuals who require a stronger, more reliable signal and dedicated IP. Priority bandwidth.

Pricing: NEW 1.1.2011

Consumer Class:	**1.5mb**	**$49.95** Residential (1 yr. term)
	5mb	**$89.95** Residential and commercial (1 yr)
Carrier Class:	**5mb**	**$129.95** Commercial (1 yr)
	10 mb	**$190.95** Commercial (1 yr) Includes public IP address

Installation:

Installation prices may vary depending on the complexity of your internal computer network and the amount of materials needed to install wireless at your location.

Customer network or router configuration (programming and or set-up) is additional and billed at $60.00 per hour, 1/2 hr minimum.

Pricing:

Consumer class:	**Residential**	**$200.00**
	Commercial	**$350.00**

Standard 600mw 2.4 or 5.8ghz CPE, pedestal wall mount 11db radio, 75' cat-5e exterior cable. Grounded cat-5e at POE.

Exhibit B: Service Area

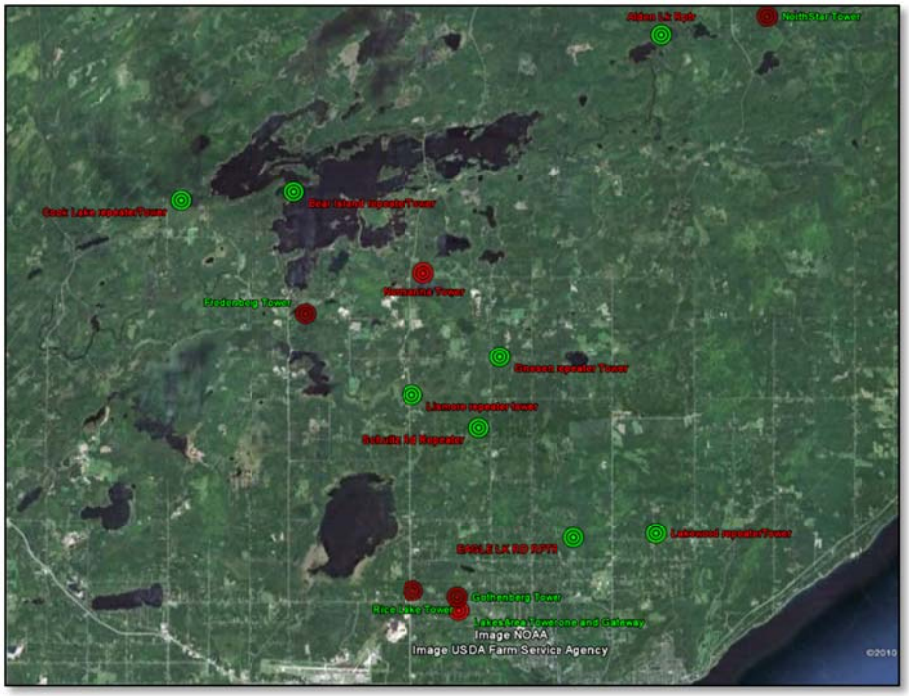
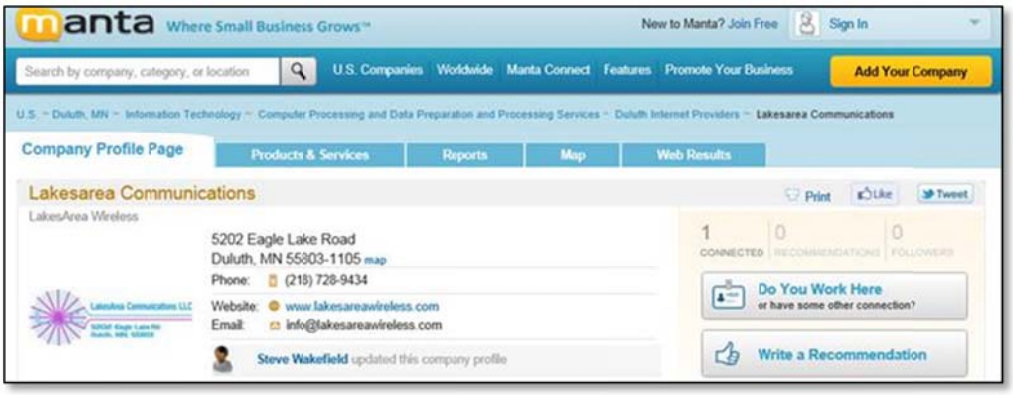


Exhibit C: Manta Information



Preliminary Identification of Provider's Coverage Area

Connected Nation attempted to identify LW's service area map from their website. The website service area was utilized to create a Google Earth image overlay **(Exhibit D).** The image overlay was positioned to match the Google Earth base map's roadways, county boundaries, and water bodies. The degree of accuracy of the image overlay was maintained at less than .25 mile (1,320 ft.) to establish a minimum search criteria of a given transmit site and/or wireless access point. The provider's service area depiction is represented as circular symbols as shown in **Exhibit B**. The coordinates of the 12 identified locations were entered into Google Earth and examined utilizing the zoom option of the aerial imagery. Three locations structures were immediately identified. This provided a means of establishing or triangulating coordinates for the remaining transmit sites and wireless access point locations and then all potential locations were entered into the Microsoft *Streets & Trips* mapping application **(Exhibit E)** to develop a route for the validation process.

Exhibit D: Google Earth: LW's Service Area Image Overlay

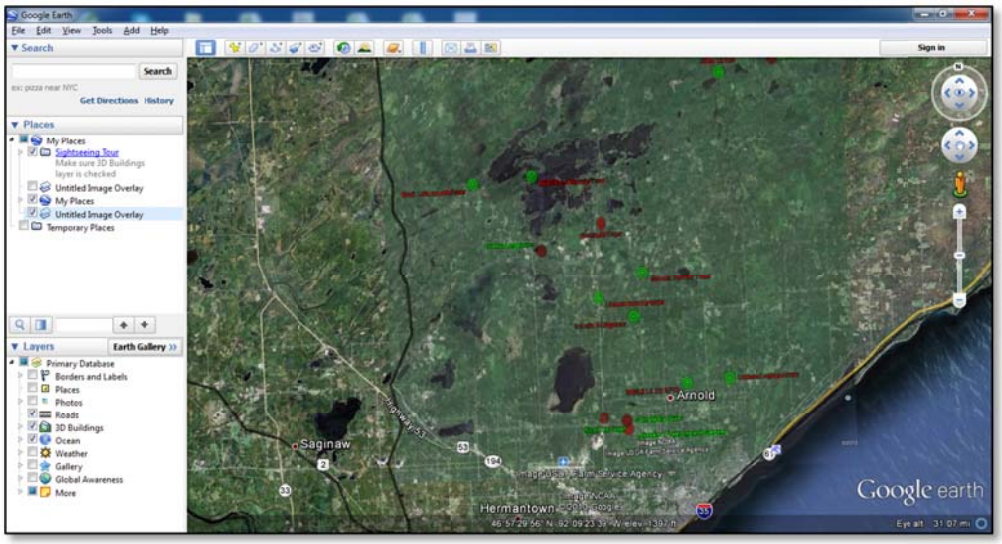
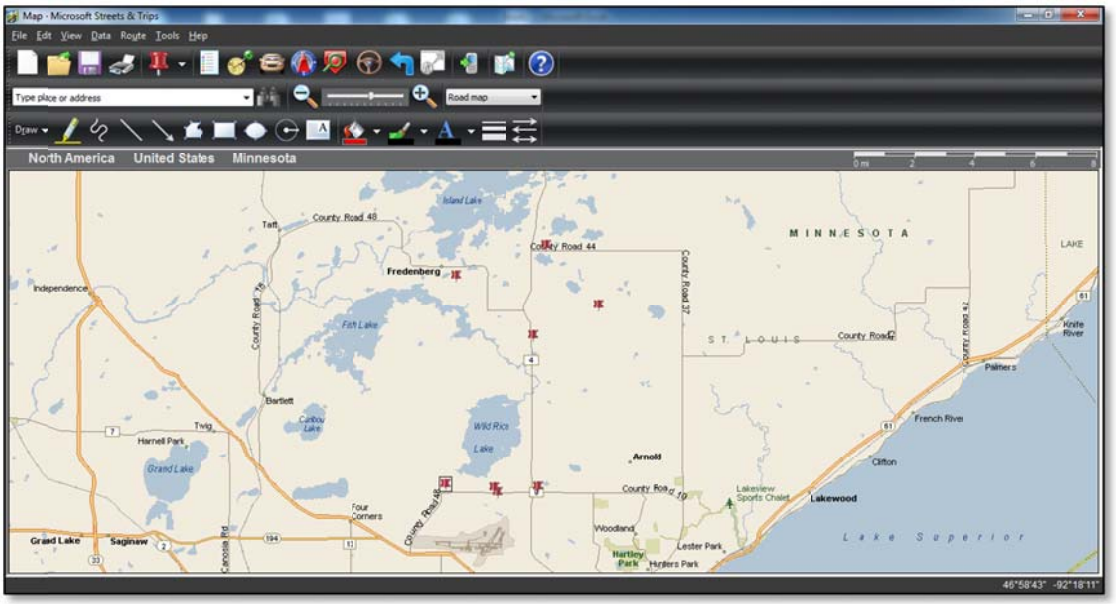


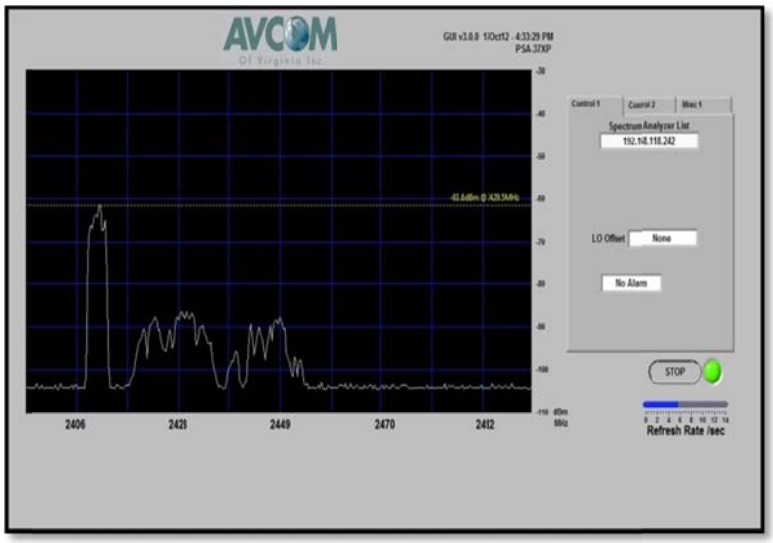
Exhibit E: Validation Points for Transmit Sites and AP Structures

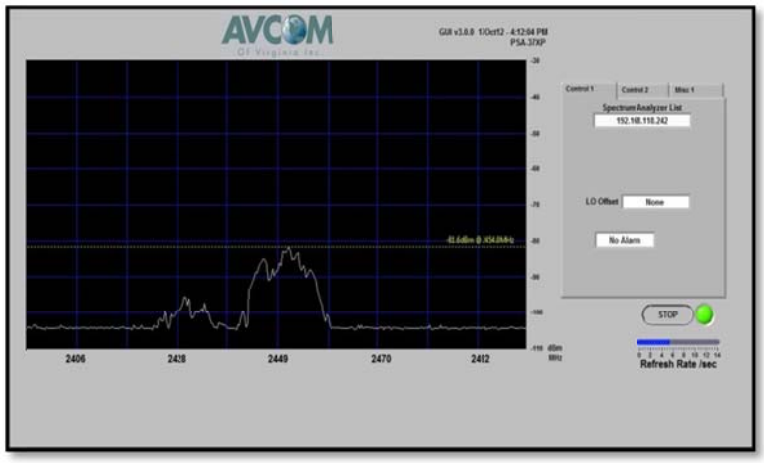


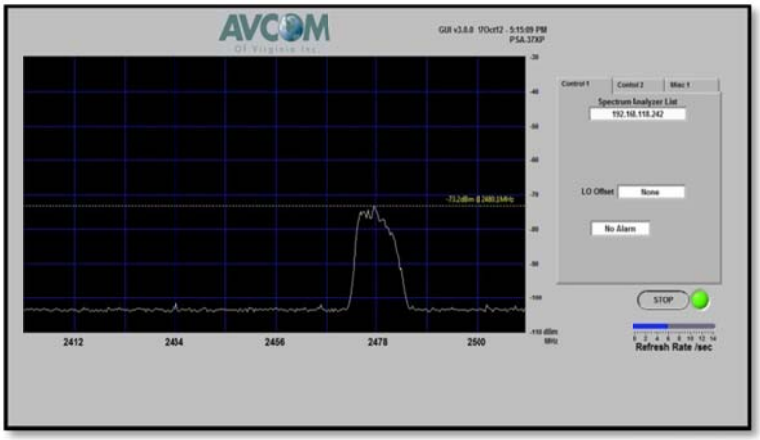
Testing Techniques

Connected Nation staff developed a site validation route based on data established with the Google Earth image overlay for LW. The CN wireless engineer was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands **(Exhibit F)**. Each validation point was scrutinized for frequency of operation. A screen image of the operating frequency (or frequencies) was captured; general notes were recorded for each location-approximate antenna height, frequency of operation, antenna type (omnidirectional or sectored) and photographs were taken of the tower sites or access points.

Exhibit F: Field Data for Lakesarea Wireless Office/Hub Location




AVCOM
Spectrum Analyzer List
192.168.118.242
LO Offset
None
No Alarm
STOP
Refresh Rate /sec
2406
2418
2449
2470
2412


AVCOM
Spectrum Analyzer List
192.168.118.242
LO Offset
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No Alarm
STOP
Refresh Rate /sec
2412
2434
2456
2478
2500


PREF
+046.9381° / -092.1531 1383ft 16:13:50
GPS POSITION - ALTITUDE - TIME ALT
MAIL
MAP
LOG
HORIZON
+01.6
ANGLE
GYRO
ELEVATION
+07.9
ANGLE
GYRO
GYRO AZIMUTH - BEARING COMP
354° N06W 6293mils TRUE
ZERO
A-B
CAL
330
N
LENS
4.0X

Name of Access Point/Transmission Location:	Decimal Degree Conversion (automatically converted here if you completed columns K, L and M)	Decimal Degree Conversion (automatically converted here if you completed columns O, P and Q)	Antenna Height	Comments: Tell us anything you feel is important for us to know about system .
Lakewood	**46.8895**	**-92.0267**	100	100 foot Omni 2400 MHz
Eagle Lake	46.88416667	-92.06916667	80	
Schultz RD Repeater	46.92778889	-92.11808611	80	
Rice Lake*	46.8659	-92.1496	80	80 foot 5700 MHz

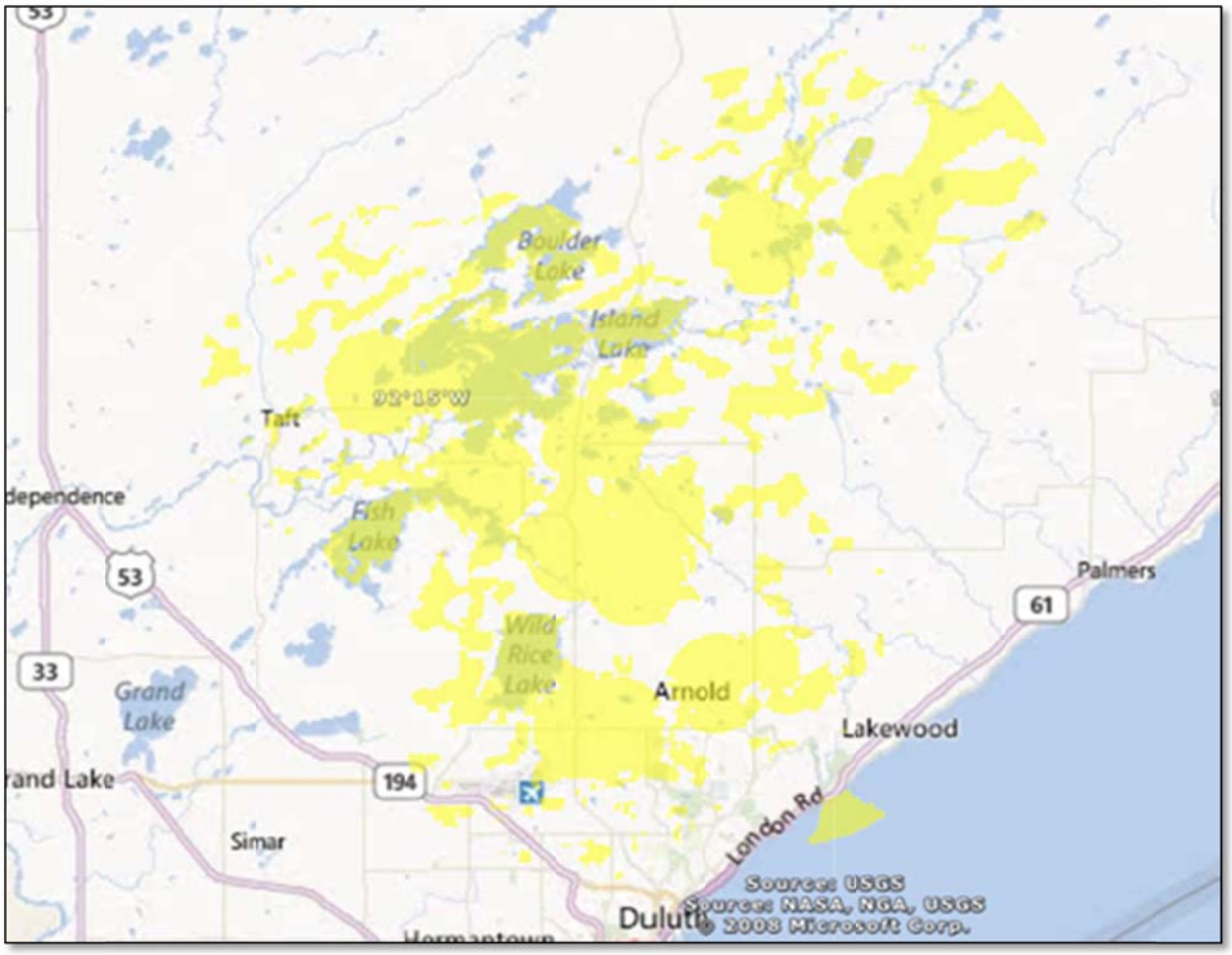
Results and Submission for April 2013

Of the 14 locations visited during the validation point route, 12 access points were identified and relative information was logged into the LW field validation notes file **(Exhibit G)**. The field and the publicly available data were transferred to the Connected Nation provider information file. A composite propagation study was completed based on the field and publicly available data gathered by the CN engineer **(Exhibit H)**. Both documents were forwarded to LW and the provider was advised that the information would be submitted to Connect Minnesota and the NTIA broadband mapping project for processing if there were no discrepancies of the estimated coverage reported by the provider within 48-hours after the receipt of the documents. As of this report date, no response has been received from the provider.

Exhibit G: Field Validation Notes

Name of Access Point/Transmission Location:	Decimal Degree Conversion (automatically converted here if you completed columns K, L and M)	Decimal Degree Conversion (automatically converted here if you completed columns O, P and Q)	Antenna Height	Comments: Tell us anything you feel is important for us to know about system .
Lakewood	**46.8895**	**-92.0267**	100	100 foot Omni 2400 MHz
Eagle Lake	46.88416667	-92.06916667	80	
Schultz RD Repeater	46.92778889	-92.11808611	80	
Rice Lake*	46.8659	-92.1496	80	80 foot 5700 MHz
Lismore*	46.9381	-92.1531	40	40 foot Omni 2400
Giessen Repeater*	46.9526	-92.1073	80	80 foot Omni 2400 MHz
Normana*	46.9815	-92.1441	90	90 feet Omni 2400Mhz
Alden Lake*	47.0631	-92.0428	100	Signal cant get to tower 100 foot Omni 2400MHz
Cook Lake*	47.00641667	-92.27273333	80	
Bear Island *	47.01327778	-92.21294444	80	
Freedenberg *	46.9669	-92.2075	140	140 foot Omni 2400MHz Could see not get close too
North Star *	47.07277778	-91.96638889	80	Location on different form added here for reference only
Gothenburg	46.86716667	-92.12902778	80	Missed initially
Lakesarea Tower One GW	46.86380556	-92.12897778	80	Missed initially

Exhibit H: Lakesarea Wireless Composite Coverage



NATE'S NET, INC.

As part of its ongoing broadband mapping efforts, Connected Nation (CN) has developed a series of processes with the goal of submitting mapping data to NTIA for every known and qualifying broadband provider, regardless of whether the provider has chosen to support and participate in the State Broadband Initiative (SBI) mapping program.

The following narrative provides detail regarding the recent data collection activities related to Nate's Net, Inc. (Nate's), a wireless Internet service provider (WISP), located in Milbank, South Dakota, with a service area around Ortonville and Browns Valley, Minnesota. The narrative will include information regarding how and where CN obtained publicly available data and the on-the-ground due diligence, verification, and validation techniques that support the underlying data.

Background

CN staff members have continued trying to obtain the participation of the provider with 10 instances of communication via telephone and e-mail sessions since October 25, 2012, through February 25, 2013. Recently a representative from Nate's provided some very basic information regarding the provider's transmit sites on February 13, 2013. Prior to the February 13, 2013, discussion, a CN staff member visited Nate's office on August 16, 2012, and again on October 24, 2012, to discuss the broadband mapping project in person with company representatives but no tangible information was provided.

The Issue

Nate's Net, by its lack of responsiveness since October 25, 2012, has predicated its unwillingness to participate in the Connect Minnesota broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN began building a file based on research information, details collected from an October 25, 2013 phone discussion including maximum residential speed offering and, as time progressed, enriched the file with information obtained through the public domain. For example, CN reviewed the provider's website (www.natesnet.com) to determine the residential service plans **(Exhibit A)** and the service area **(Exhibit B)** of the provider's wireless network. As illustrated by these exhibits, CN was initially unable to determine maximum advertised speeds or actual coverage areas. A search for a Federal Registration Number (FRN) on the FCC **CO**mmission **RE**gistration **S**ystem (CORES) system yielded an FRN of 0019920818 **(Exhibit C)** with contact information relative to the owner of the company. Also, to support field validation of potential wireless transmit sites and/or access points, the FRN was referenced against the FCC Universal Licensing System (ULS) to identify any authorizations the provider may hold for licensed spectrum or leasing arrangements which could possibly enhance locating active transmit sites and/or wireless access points for the service area. This process yielded a 3650 MHz authorization for Station WQMG640 (**Exhibit D)**, with 0 registered unique locations.

Exhibit A: Service Plans

Exhibit B: Service Area

Exhibit C: Federal Registration Number

Registration Detail	
FRN:	0019920818
Registration Date:	06/11/2010 11:34:00 AM
Last Updated:	10/28/2012 02:32:15 PM
Business Name:	Nates Net Inc.
Business Type:	Private Sector , Corporation
Contact Organization:	Nates Net Inc.
Contact Position:	President
Contact Name:	Nathaniel Spors
Contact Address:	325 S Main St. Milbank, SD 57252-1810 United States
Contact Email:	fspors@natesnet.com
ContactPhone:	(605) 432-1222
ContactFax:	

Exhibit D: WQMG640 License Reference

MAIN | ADMIN | LOCATIONS

Call Sign	WQMG640	Radio Service	NN - 3650-3700 MHz
Status	Active	Auth Type	Regular
Dates			
Grant	08/03/2010	Expiration	08/03/2020
Effective	08/03/2010	Cancellation	

Area of Operation: N

Operating Nationwide including Hawaii, Alaska, and US Territories.

Frequency Bands

003650.00000000-003700.00000000

Licensee

FRN	0019920818 (View Ownership Filing)	Type	Corporation
Licensee			
Nates Net Inc. 325 S Main St. Milbank, SD 57252 ATTN Nathaniel Spors		P: (605)432-1222 E:fspors@natesnet.com	

MAIN | ADMIN | LOCATIONS

Call Sign	WQMG640	Radio Service	NN - 3650-3700 MHz

0 Total Locations
10 Locations per Summary Page

No Locations

0 Total Locations
10 Locations per Summary Page

Preliminary Identification of Provider's Coverage Area

Connected Nation initially estimated the provider's service area from information obtained through on-the-ground research that occurred on October 17, 2012, identification of customer premise equipment (CPE) and discussions with local residents of the area. This information was then used to create a Google Earth image overlay **(Exhibit E).** The image overlay was positioned to match the Google Earth base map's roadways, county boundaries, and water bodies. The degree of accuracy of the image overlay was maintained at less than .25 mile (1320 ft.) to establish a minimum search criteria of a given access point. The provider's service area depiction is represented by tower symbols. The provider's transmit sites were then entered into Google Earth and cross-examined utilizing the zoom option of the aerial imagery. This provided a means of establishing coordinates for the access point locations. All 4 locations were entered into Microsoft *Streets & Trips* mapping application **(Exhibit F)** to develop a route for additional validation exercises.

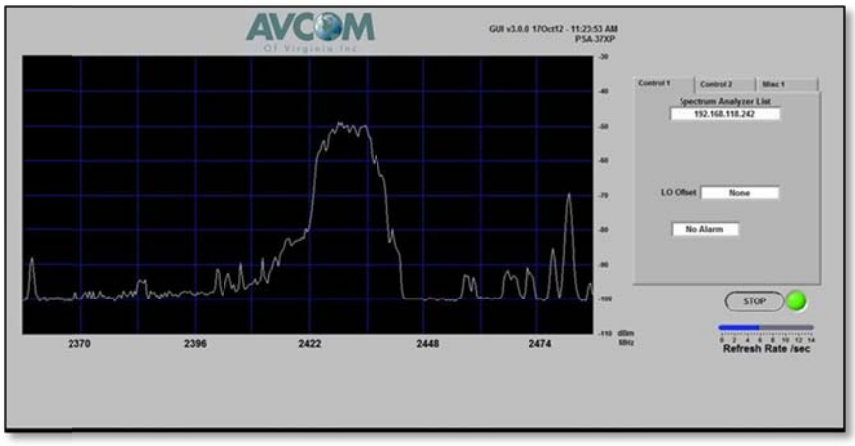
Exhibit E: Google Earth: Nate's Net's Service Area Image Overlay

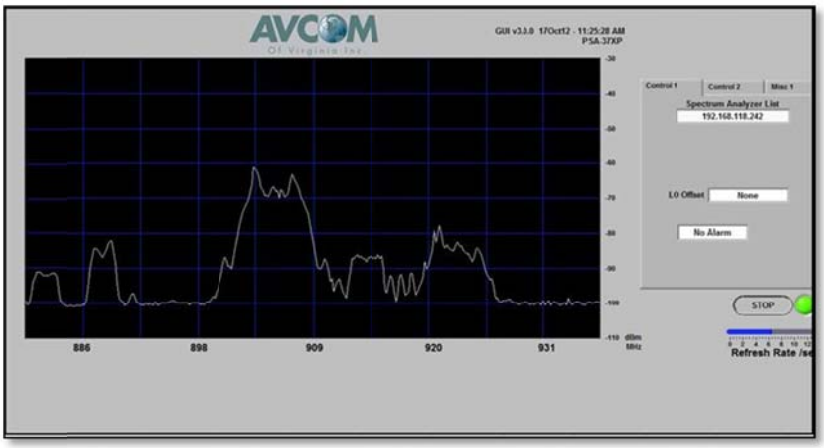
Exhibit F: Validation Points for Tower Sites and Access Points

Testing Techniques

Connected Nation staff developed a site validation route based on data established with the Google Earth image overlay. The CN wireless engineer was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands **(Exhibit G)**. Each validation point was scrutinized for frequency of operation. A screen image of the operating frequency (or frequencies) was captured; general notes were recorded for each location-approximate antenna height, frequency of operation, antenna type (omnidirectional or sectored), and photographs were taken of the tower sites and wireless access points.

Exhibit G: Field Data for Nate's Net




AVCOM
Of Virginia Inc
GUI v3.3.0 17Oct12 - 11:25:28 AM
PSA-37XP
Control 1
Control 2
Misc 1
Spectrum Analyzer List
192.168.118.242
LO Offset
None
No Alarm
STOP
886
898
909
920
931
dBm
MHz
Refresh Rate /se


NATE'S INTERNET
Computer Specialist - Nathan Spors
HOURS
MONDAY FRIDAY
930 TO 5:30
LUNCH 12:30 1:30
SATURDAY
BY APPOINTMENT
CLOSED
RETURN AGAIN


OCT 17 201


OCT 17 2012


OCT 17 2012

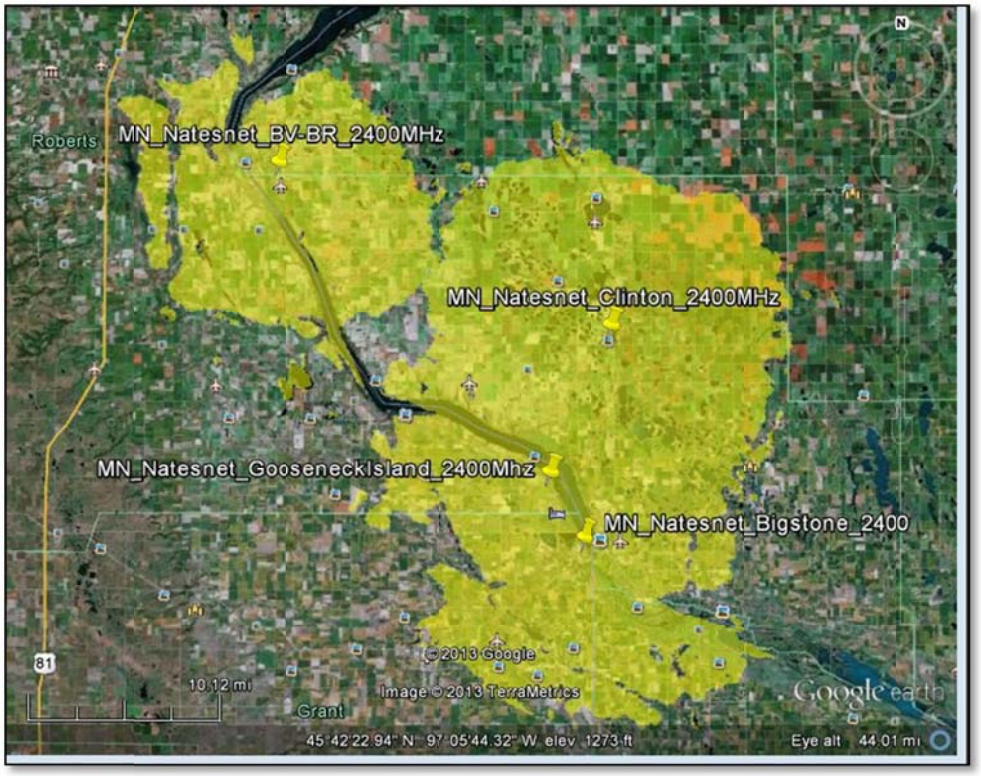
Results and Submission for April 2013

Of the four locations visited during the validation point route, four access points were identified, and relative information was logged into the Nate's Net field validation notes file **(Exhibit H)**. The field notes and the publicly available data were transferred to the Connected Nation provider information file and a composite propagation study was completed based on the field data **(Exhibit I)**. This coverage estimation document was then forwarded to Nate's Net and the provider was advised that the information will be submitted to Connect Minnesota and the NTIA broadband mapping project for processing unless the provider reported discrepancies of the estimated coverage area within a 48-hour period after receipt. As of this report, no response has been received from the provider.

Exhibit H: Field Validation Notes

	Provider	Test Site Info							Notes
Date	Provider	Test City	Test State	Physical Address	Location Description	Peak Sig Strength	Spectrum Analyzer	Time	
10/17/12	Nates Net	Big Stone Lake	SD	14340 SD Hwy 109	Small Tower Overlooking Lake	-51	Avcom PSA-37XP	11:05am	Site serves into MN across Big Stone Lake
10/17/12	Nates Net	Big Stone City	SD	14400 SD Hwy 109	Water Tower	-50	Avcom PSA-37XP	11:18am	Site serves into MN across Big Stone
10/17/12	Nates Net	Ortonville	MN	Crestview Ave/Summerset St	Residential Location	-50	Avcom PSA-37XP	12:00pm	CPE (looking back across Big Stone Lake to water tower)
10/17/12	Nates Net	Clinton	MN	428 1st Street	Water Tower	-49	Avcom PSA-37XP	12:30pm	
10/17/12	Nates Net	Milbank	SD	325 South Main	Business Office				Milbank, South Dakota Business Office

Exhibit I: Nate's Net Estimated Composite Coverage



Appendix B: Broadband Provider Log

Broadband Provider Log

Complete	198
Non-Responsive/Refused	1
In Progress	1
Reseller Providing Data	0
Count of Datasets by Status	**200**
Total Unique Providers Represented	**126**

Provider Name	Platform	Status	NDA Execution Date	Notes
A Better Wireless, NISP, LLC	Fixed Wireless	Data Added to Statewide Inventory		[JAN-22-13 Brian Dudek] Correction: Provider is now a willing participant for the April 2013 submission. Was previously Connected Nation estimated coverage.
Ace Telephone Association	Fixed Wireless	Data Added to Statewide Inventory	8/3/2010	[MAR-01-13 Brian Dudek] Correction: Initial submission of platform coverage, but they were in service previously.
Ace Telephone Association	DSL	Data Added to Statewide Inventory	8/3/2010	[FEB-28-13 Brian Dudek] Change/Correction: Provider upgraded infrastructure to allow max advertised speeds of tier 7 download and tier 3 upload in entire DSL territory. Refined coverage in some areas.
Ace Telephone Association	Fiber	Data Added to Statewide Inventory	8/3/2010	[FEB-06-13 Brian Dudek] Change: New provider platform for the April 2013 submission. Two small FTTH areas.
Arvig	DSL	Data Added to Statewide Inventory	4/20/2010	[DEC-17-12 Brian Dudek] Change: Provider expanded DSL territory SW of Kimball. Also upgraded speed capabilities to tier 5 throughout territory.
AT&T Corp, Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/16/2009	[FEB-25-13 Brian Dudek] Change/Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission. There is notable expansion in central and northeastern MN. Also added 4G services in the twin city metro area.
Benton Cooperative Telephone Company	Fixed Wireless	Data Added to Statewide Inventory	6/16/2010	[MAR-04-13 Brian Dudek] Change: New provider platform for April 2013 submission. Service covers same territory as their mobile offering.
Benton Cooperative Telephone Company	Cable	Data Added to Statewide Inventory	6/16/2010	[FEB-19-13 Brian Dudek] Change: Provider expanded cable territory around Rice. Upgraded infrastructure and can now offer max advertised download speeds of tier 7 and upload speeds of tier 4.
Benton Cooperative Telephone Company	Cable	Data Added to Statewide Inventory	6/16/2010	[FEB-19-13 Brian Dudek] Change/Correction: Provider added additional coverage to prior Milaca Local Link file, but also removed coverage where the technology changes to DSL and Fiber. Upgraded infrastructure and can now offer max advertised download speeds of tier 7 and upload speeds of tier 4.
Benton Cooperative Telephone Company	DSL	Data Added to Statewide Inventory	6/16/2010	[FEB-19-13 Brian Dudek] Change: New provider platform subsidiary for April 2013 submission.
Benton Cooperative Telephone Company	Fiber	Data Added to Statewide Inventory	6/16/2010	[FEB-19-13 Brian Dudek] Change: Provider expanded fiber territory around Rice. Upgraded infrastructure and can now offer max advertised speeds of tier 10.
Benton Cooperative Telephone Company	Fiber	Data Added to Statewide Inventory	6/16/2010	[FEB-19-13 Brian Dudek] Change: New provider subsidiary platform for April 2013 submission.
Blue Sky Broadband	Fixed Wireless	Data Added to Statewide Inventory	12/4/2012	[FEB-28-13 Brian Dudek] Change: New provider for the April 2013 submission.
Blueprint America, Inc.	Fixed Wireless	Data Added to Statewide Inventory	8/16/2012	[FEB-28-13 Brian Dudek] Change: Provider expanded wireless coverage in multiple areas and also upgraded infrastructure to allow for max advertised speeds of tier 7.
Broadband Corp	Fixed Wireless	Data Added to Statewide Inventory	5/11/2010	[MAR-01-13 Brian Dudek] Change: Provider now has additional 3650 sites expanding coverage south of Arlington and west toward Prinsburg.

Cable ONE Inc.	Cable	Data Added to Statewide Inventory	12/7/2009	[FEB-04-13 Brian Dudek] Change/Correction: possible service expansion or corrections to previous dataset; entirely new dataset for April 2013 submission.
CenturyLink	DSL	Data Added to Statewide Inventory	12/4/2009	[FEB-28-13 Brian Dudek] Change/Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
CenturyLink	Fiber	Data Added to Statewide Inventory	12/4/2009	[FEB-18-13 Brian Dudek] Change: New provider platform for the April 2013 submission.
Clearwire Corporation	Mobile Wireless	Data Added to Statewide Inventory	3/3/2010	[JAN-04-13 Brian Dudek] Change: Refined propagations indicate minor increase and decrease of mobile coverage in some areas.
Comcast Cable Communications, LLC	Cable	Data Added to Statewide Inventory	12/7/2009	[FEB-12-13 Brian Dudek] Change/Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Consolidated Telephone Company	Fiber	Data Added to Statewide Inventory	3/1/2012	[JAN-08-13 Brian Dudek] Change: Provider expanded fiber territory into Lincoln, Randall, and Nokay Lake area.
Farmers Mutual Telephone Company	Fiber	Data Added to Statewide Inventory	4/1/2010	[FEB-04-13 Brian Dudek] Change: Provider expanded fiber territory into the majority of Lac qui Parle County.
Federated Telephone Cooperative	Fiber	Data Added to Statewide Inventory	4/1/2010	[FEB-04-13 Brian Dudek] Change: Provider indicated Hometown Solutions, LLC should now be listed as Federated Telephone Cooperative; it's included in this dataset.
Frontier Communications of Minnesota, Inc.	DSL	Data Added to Statewide Inventory	1/22/2010	[FEB-26-13 Brian Dudek] Change: Provider gave varying line distances for many areas in MN resulting in more accurate speeds. Also expanded coverage into the town of Loman and a few other small areas. Also corrected an incorrect DSLAM coverage location.
Garden Valley Telephone Company	DSL	Data Added to Statewide Inventory	2/17/2010	[JAN-30-13 Brian Dudek] Change: Provider converted DSL infrastructure to fiber in rural Fertile exchange and the entirety of the Beltrami exchange. Elsewhere max advertised speeds increased to tier 8 download and upload within the county/city boundaries.
Garden Valley Telephone Company	Fiber	Data Added to Statewide Inventory	2/17/2010	[JAN-30-13 Brian Dudek] Change: Provider expanded fiber territory into rural Fertile exchange and the entirety of the Beltrami exchange. Max advertised speeds increased to tier 8 download and upload.
Halstad Telephone Company	Fiber	Data Added to Statewide Inventory	6/16/2010	[JAN-30-13 Brian Dudek] Change: Provider expanded fiber territory slightly further north in the direction of East Grand Forks.
Harmony Telephone Company	DSL	Data Added to Statewide Inventory	1/12/2010	[JAN-16-13 Brian Dudek] Change/Correction: Provider indicated the previously reported fiber coverage was actually all DSL. Were also incorrectly reporting fiber speeds. Hence, upload corrected to tier 4.
Hiawatha Broadband Communications, Inc.	Fixed Wireless	Data Added to Statewide Inventory	3/8/2010	[JAN-09-13 Brian Dudek] Change/Correction: Provider added multiple transmission locations in the counties of Goodhue, Wabasha, and Winona. Provider also increased prior maximum advertised download and upload speeds to tier 7. Provider stated Stockholm, MN tower should be removed as it was incorrectly listed.
InvisiMax, Inc.	Fixed Wireless	Data Added to Statewide Inventory	2/29/2012	[FEB-05-13 Brian Dudek] Change: Provider expanded coverage in multiple areas, particularly East Grand Forks and east of Enok. Speeds were also changed in much of the provider's territory.
Kasson & Mantorville Telephone Company	Fiber	Data Added to Statewide Inventory	6/30/2010	[MAR-05-13 Brian Dudek] Change: New provider platform for the April 2013 submission.
Lakenet Communications	Fixed Wireless	Data Added to Statewide Inventory	10/18/2012	[JAN-22-13 Brian Dudek] Change: New provider for April 2013 submission.
MegaPath Corporation	DSL	Data Added to Statewide Inventory	2/15/2010	[FEB-14-13 Brian Dudek] Change/Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.

Midcontinent Communications	Cable	Data Added to Statewide Inventory	12/9/2009	[FEB-05-13 Brian Dudek] Change: Provider expanded coverage in multiple areas across MN, but particularly in rural Tower, Soudan and in east central Dakota County. Also increased max advertised download and upload speeds in central MN coverage area.
Minnesota Valley TV Improvement Corporation	Fixed Wireless	Data Added to Statewide Inventory	4/13/2010	[MAR-04-13 Brian Dudek] Change: Provider expanded wireless territory in towns of Traverse and Belgrade.
Minnesota WiFi LLC	Fixed Wireless	Data Added to Statewide Inventory	1/28/2013	[FEB-28-13 Brian Dudek] Change: New provider for the April 2013 submission.
Moose-Tec	Fixed Wireless	Data Added to Statewide Inventory	2/22/2013	[MAR-01-13 Brian Dudek] Correction: Initial submission of provider's coverage, but they were in service previously.
Paul Bunyan Rural Telephone Cooperative	DSL	Data Added to Statewide Inventory	6/24/2010	[JAN-14-13 Brian Dudek] Change/Correction: Better dataset resulted in minor adjustments being made to the DSL coverage. DSL removed in areas where fiber now exists.
Paul Bunyan Rural Telephone Cooperative	Fiber	Data Added to Statewide Inventory	6/24/2010	[JAN-08-13 Brian Dudek] Change: Provider expanded fiber territory in Big Falls, Hines, Little Rock, Red Lake, south of Lake George and rural Blackduck.
Radio Link Internet	Fixed Wireless	Data Added to Statewide Inventory		[JAN-28-13 Brian Dudek] Change: Provider added transmission locations and altered others; coverage now reaches 11 counties. Additionally, provider upgraded infrastructure and can now offer max advertised speeds of tier 8 download and tier 7 upload.
Red River Rural Telephone Association	DSL	Data Added to Statewide Inventory	3/17/2010	[FEB-21-13 Brian Dudek] Change: Provided converted some of their DSL infrastructure over to fiber.
Red River Rural Telephone Association	Fiber	Data Added to Statewide Inventory	3/17/2010	[FEB-21-13 Brian Dudek] Change: Provider expanded fiber territory in their Fairmount exchange and portions of Barnesville and Rollag.
Red River Rural Telephone Association	Fixed Wireless	Data Added to Statewide Inventory	3/17/2010	[MAR-01-13 Brian Dudek] Change: Provider added a 3650 transmission in Breckenridge.
Rothsay Telephone Company Inc.	Fiber	Data Added to Statewide Inventory	2/18/2010	[JAN-07-13 Brian Dudek] Change: New provider platform in service for April 2013 submission.
Sjoberg's Inc.	Cable	Data Added to Statewide Inventory	12/21/2009	[MAR-01-13 Brian Dudek] Change: Provider upgraded infrastructure and increased max advertised cable speeds to tier 8 download and tier 6 upload in their service areas of Roseau, Baudette, and Warroad. Some territory increase in Roseau and Thief River Falls.
Skycasters	Satellite	Data Added to Statewide Inventory	10/16/2012	[OCT-29-12 Brian Dudek] Correction: Initial submission of provider's coverage, but they were in service previously.
SMBS	Fiber	Data Added to Statewide Inventory		[MAR-04-13 Brian Dudek] Change: Provider expanded fiber territory in Jackson County and parts of Cottonwood and Nobles.
Sprint Nextel Corporation	Mobile Wireless	Data Added to Statewide Inventory	1/14/2010	[FEB-22-13 Brian Dudek] Change/Correction: Coverage differences are very minor; entirely new dataset provided for April 2013 submission.
Starpoint Communications, Inc.	Fixed Wireless	Data Added to Statewide Inventory	2/18/2011	[MAR-01-13 Brian Dudek] Change: Provider added multiple 5700 sites increasing max advertised download and upload speeds to tier 5 in many areas.
T-Mobile USA, Inc.	Mobile Wireless	Data Added to Statewide Inventory	1/8/2010	[FEB-25-13 Brian Dudek] Change/Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission. There is notable expansion near Hackensack and Whipholt.
TDS Telecommunications Corporation	DSL	Data Added to Statewide Inventory	1/27/2010	[FEB-22-13 Brian Dudek] Change/Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
TDS Telecommunications Corporation	Fiber	Data Added to Statewide Inventory	1/27/2010	[FEB-13-13 Brian Dudek] Change/Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.

VAL-ED Joint Venture, LLP	Fixed Wireless	Data Added to Statewide Inventory	4/21/2010	[JAN-31-13 Brian Dudek] Change: 702 Communications acquired North Dakota based provider i29wireless, and this coverage is now submitted in the dataset as it extends into MN territory. Purchase expanded their wireless service area outward roughly 10 miles.
Verizon Communications, Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/14/2009	[FEB-22-13 Brian Dudek] Change/Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission. There is definitely significant 4G expansion across the state.
Winnebago Cooperative Telecom Association	DSL	Data Added to Statewide Inventory	6/17/2010	[FEB-26-13 Brian Dudek] Change: Provider converted majority of DSL territory to fiber.
Winnebago Cooperative Telecom Association	Fiber	Data Added to Statewide Inventory	6/17/2010	[FEB-26-13 Brian Dudek] Change: Provider expanded fiber territory into majority of its MN exchanges.
Woodstock Telephone Company	Fiber	Data Added to Statewide Inventory	2/18/2010	[JAN-14-13 Brian Dudek] Change: Provider expanded fiber territory into previously DSL service areas. Increased max advertised fiber speeds to tier 9 download and tier 7 upload. DSL now inactive.
Level 3 Communications, LLC	Backhaul	Backhaul Provider Only Processing	12/14/2009	
MegaPath Corporation	Backhaul	Backhaul Provider Only Processing	2/15/2010	
Midcontinent Communications	Backhaul	Backhaul Provider Only Processing	12/9/2009	
Savage Communications Inc.	Backhaul	Backhaul Provider Only Processing	2/19/2010	
Sprint Nextel Corporation	Backhaul	Backhaul Provider Only Processing	1/14/2010	
Winnebago Cooperative Telecom Association	Backhaul	Backhaul Provider Only Processing	6/17/2010	
Benton Cooperative Telephone Company	DSL	Speed Only Update; Data Processing Complete	6/16/2010	[FEB-19-13 Brian Dudek] Change: Provider upgraded infrastructure and can now offer max advertised download speeds of tier 7 and upload speeds of tier 4.
Halstad Telephone Company	DSL	Speed Only Update; Data Processing Complete	6/16/2010	[JAN-30-13 Brian Dudek] Change: Provider indicated that they now have VDSL2 capable of bonding to meet max advertised speeds of tier 10 download and tier 9 upload.
Hiawatha Broadband Communications, Inc.	Cable	Speed Only Update; Data Processing Complete	3/8/2010	[JAN-07-13 Brian Dudek] Change: Provider upgraded infrastructure and increased max advertised cable speeds to tier 10 download and tier 5 upload.
Hiawatha Broadband Communications, Inc.	Fiber	Speed Only Update; Data Processing Complete	3/8/2010	[JAN-07-13 Brian Dudek] Change: Provider upgraded infrastructure and increased max advertised fiber speeds to tier 10 download and tier 9 upload.
Hickory Tech Corporation	DSL	Speed Only Update; Data Processing Complete		[FEB-19-13 Brian Dudek] Change/Correction: Provider upgraded infrastructure and can now offer max advertised download speed of tier 7 in the Cambria exchange. Corrected Garden City max advertised download speed to tier 6.
Hughes Network Systems, LLC	Satellite	Speed Only Update; Data Processing Complete	2/5/2010	[MAR-06-13 Brian Dudek] Change: Provider upgraded infrastructure and increased max advertised satellite speeds to tier 7 download and tier 4 upload.
Hutchinson Telecommunications, Inc.	DSL	Speed Only Update; Data Processing Complete	4/14/2010	[JAN-07-13 Brian Dudek] Change: Provider upgraded infrastructure and increased their max advertised asymmetrical DSL upload to tier 5.
Kasson & Mantorville Telephone Company	DSL	Speed Only Update; Data Processing Complete	6/30/2010	[MAR-05-13 Brian Dudek] Change/Correction: Provider was only reporting maximum advertised speed regardless of area in past submissions. Multiple speeds now exist. City of Dodge Center now has max advertised speeds of tier 7.
Manchester-Hartland Telephone Company	Fiber	Speed Only Update; Data Processing Complete	4/14/2010	[JAN-22-13 Brian Dudek] Change: Provider upgraded infrastructure and increased max advertised fiber upload speed to tier 5.
Mediacom Communications Corporation	Cable	Speed Only Update; Data Processing Complete	1/12/2010	[MAR-05-13 Brian Dudek] Change/Correction: Provider sent in speed updates for entire coverage area. Nearly half of service area now advertises max speeds of tier 10 download and tier 7 upload. A quarter of service area now advertises max speeds of tier 9 download. Upload speeds were refined to tier 5 in the tier 9 and 7 download areas.

Minnesota Valley Telephone Company	DSL	Speed Only Update; Data Processing Complete	4/29/2010	[FEB-14-13 Brian Dudek] Change/Correction: Provider upgraded infrastructure in Franklin and Lucan exchanges and increased max advertised download speeds to tier 7. Decreased max advertised upload speed tier in Lucan, Milroy and Winthrop exchanges to tier 4, as business upload speeds were incorrectly reported in last submission.
New Ulm Telecom, Inc.	DSL	Speed Only Update; Data Processing Complete	2/25/2010	[JAN-07-13 Brian Dudek] Change: Provider upgraded infrastructure and increased their max advertised asymmetrical DSL upload to tier 5.
Park Region Mutual Telephone Company	DSL	Speed Only Update; Data Processing Complete	3/18/2010	[JAN-29-13 Brian Dudek] Change: Provider upgraded infrastructure to allow max advertised speed of tier 7 download and tier 5 upload within the Valley Telephone Company exchanges. Upload was also increased to tier 5 in the Park Region Mutual Telephone Company exchanges.
Park Region Mutual Telephone Company	Fiber	Speed Only Update; Data Processing Complete	3/18/2010	[JAN-31-13 Brian Dudek] Change/Correction: Provider upgraded infrastructure and increased max advertised download speeds to tier 9 within the Park Region Mutual Telephone Company and Valley Telephone Company exchanges.
Rothsay Telephone Company Inc.	DSL	Speed Only Update; Data Processing Complete	2/18/2010	[JAN-07-13 Brian Dudek] Change: Provider upgraded infrastructure and increased max advertised DSL speeds to tier 6 download.
Savage Communications Inc.	Cable	Speed Only Update; Data Processing Complete	2/19/2010	[JAN-31-13 Brian Dudek] Change: Provider upgraded infrastructure and increased max advertised speeds to tier 7 download and tier 5 upload throughout service area.
West Central Telephone Association	DSL	Speed Only Update; Data Processing Complete	2/18/2010	[FEB-13-13 Brian Dudek] Change: Provider upgraded infrastructure and increased max advertised DSL speeds to tier 7 download.
West Central Telephone Association	Fiber	Speed Only Update; Data Processing Complete	2/18/2010	[FEB-13-13 Brian Dudek] Change: Provider upgraded infrastructure and increased max advertised fiber speeds to tier 8 download and upload.
Western Telephone Company	DSL	Speed Only Update; Data Processing Complete	4/14/2010	[JAN-07-13 Brian Dudek] Change: Provider upgraded infrastructure and increased their max advertised asymmetrical DSL upload to tier 5.
Windstream Communications	DSL	Speed Only Update; Data Processing Complete		[MAR-05-13 Brian Dudek] Change/Correction: Provider supplied more accurate speed data on the block level. Previously were submitted on the MSA/RSA level.
Nextera Communications	Fixed Wireless	No Update-Estimated Coverage Submitted for Non-Participating		
tothehome.com, LLC	Fixed Wireless	No Update-Estimated Coverage Submitted for Non-Participating		
Access Broadband	Fixed Wireless	Estimated Coverage Submitted for Non-Participating Provider		[MAR-05-13 Brian Dudek] Correction: New provider for April 2013 submission that was and has been unresponsive. Connected Nation estimated coverage for this provider.
AirFiber	Fixed Wireless	Estimated Coverage Submitted for Non-Participating Provider		[MAR-05-13 Brian Dudek] Change: New provider for April 2013 submission that was unresponsive this round. Connected Nation estimated coverage for this provider.
LakesArea Wireless	Fixed Wireless	Estimated Coverage Submitted for Non-Participating Provider		[MAR-05-13 Brian Dudek] Change: New provider for April 2013 submission that has been unresponsive. Connected Nation estimated coverage for this provider.
Nates Net, Inc.	Fixed Wireless	Estimated Coverage Submitted for Non-Participating Provider		[MAR-04-13 Brian Dudek] Correction: New provider for April 2013 submission that was unresponsive this round and previously did not meet minimum broadband requirements. Connected Nation estimated coverage for this provider.
Albany Mutual Telephone Association	Fiber	Approval for Update Not Received – Data Still Submitted	3/4/2010	[FEB-13-13 Brian Dudek] Change: Provider's expansion of fiber into all of its exchanges is complete.
FTTH Communications	Fiber	Approval for Update Not Received – Data Still Submitted		[FEB-06-13 Brian Dudek] Change: Provider expanded fiber territory in two small areas in Rosemount. Upgraded infrastructure and can now offer max advertised download speeds of tier 10.
Ace Telephone Association	Backhaul	No Update to Provide	8/3/2010	
AirLink Broadband, LLC	Fixed Wireless	No Update to Provide		

Albany Mutual Telephone Association	DSL	No Update to Provide	3/4/2010	
Alliance Communications Cooperative, Inc.	Backhaul	No Update to Provide	3/2/2012	
Alliance Communications Cooperative, Inc.	Fiber	No Update to Provide	3/2/2012	
Arrowhead Communications Corporation	DSL	No Update to Provide	4/14/2010	
Arvig	Cable	No Update to Provide	4/20/2010	
Arvig	Fiber	No Update to Provide	4/20/2010	
Arvig Communication Systems	DSL	No Update to Provide	2/2/2011	
Arvig Communication Systems	Fiber	No Update to Provide	2/2/2011	
Arvig Communication Systems	Fixed Wireless	No Update to Provide	2/2/2011	
AT&T Corp, Inc.	Backhaul	No Update to Provide	12/16/2009	
Barnesville Municipal Telephone	DSL	No Update to Provide	3/4/2010	
Benton Cooperative Telephone Company	Mobile Wireless	No Update to Provide	6/16/2010	
Blue Earth Valley Telephone Company	Cable	No Update to Provide	6/16/2010	
Blue Earth Valley Telephone Company	DSL	No Update to Provide	6/16/2010	
Blue Earth Valley Telephone Company	Fiber	No Update to Provide	6/16/2010	
CenturyLink	Backhaul	No Update to Provide	12/4/2009	
Charter Communications, Inc.	Backhaul	No Update to Provide	12/15/2009	
Charter Communications, Inc.	Cable	No Update to Provide	12/15/2009	
Christensen Communications Company	Backhaul	No Update to Provide	2/2/2010	
Christensen Communications Company	DSL	No Update to Provide	2/2/2010	
CitEscape, LLC	Fixed Wireless	No Update to Provide	1/25/2010	
City of Detroit Lakes	Fixed Wireless	No Update to Provide	5/10/2010	
City of Windom	Fiber	No Update to Provide		
Clara City Telephone Company	DSL	No Update to Provide	2/5/2010	
Clearwire Corporation	Fixed Wireless	No Update to Provide	3/3/2010	
Consolidated Telephone Company	DSL	No Update to Provide	3/1/2012	
Consolidated Telephone Company	Fixed Wireless	No Update to Provide	3/1/2012	
Consolidated Telephone Company	Fixed Wireless	No Update to Provide	3/1/2012	
Crosslake Telephone Company	Cable	No Update to Provide	6/16/2010	
Crosslake Telephone Company	DSL	No Update to Provide	6/16/2010	
Crosslake Telephone Company	Fiber	No Update to Provide	6/16/2010	
Eagle Valley Telephone Company	DSL	No Update to Provide	4/14/2010	
Emily Cooperative Telephone Company	Fiber	No Update to Provide	6/24/2010	
Evertek Enterprises, Inc.	Fixed Wireless	No Update to Provide	6/17/2010	
Fallsnet	Fixed Wireless	No Update to Provide		
Farmers Mutual Telephone Company	Fixed Wireless	No Update to Provide	4/1/2010	
Federated Telephone Cooperative	Fixed Wireless	No Update to Provide	4/1/2010	
Felton Telephone Company	DSL	No Update to Provide	4/14/2010	
Fibernet Monticello	Fiber	No Update to Provide		
Frontier Communications of Minnesota, Inc.	Backhaul	No Update to Provide	1/22/2010	
Gardonville Cooperative Telephone Association	DSL	No Update to Provide	2/23/2010	
Gardonville Cooperative Telephone Association	Fiber	No Update to Provide	2/23/2010	
Gardonville Cooperative Telephone Association	Fixed Wireless	No Update to Provide	2/23/2010	
Genesis Wireless	Fixed Wireless	No Update to Provide		
Granada Telephone Company	DSL	No Update to Provide	4/14/2010	
Halstad Telephone Company	Fixed Wireless	No Update to Provide	6/16/2010	
Hickory Tech Corporation	DSL	No Update to Provide		
Hickory Tech Corporation	Fixed Wireless	No Update to Provide		
Hutchinson Telecommunications, Inc.	Fixed Wireless	No Update to Provide	4/14/2010	
Info Link Wireless, Inc.	Fixed Wireless	No Update to Provide	4/19/2010	
Interstate Telecommunications Cooperative, Inc.	DSL	No Update to Provide	2/10/2010	
Interstate Telecommunications Cooperative, Inc.	Fiber	No Update to Provide	2/10/2010	
Jab Wireless, Inc.	Fixed Wireless	No Update to Provide	6/14/2010	
Jaguar Communications	DSL	No Update to Provide	4/12/2010	
Jaguar Communications	Fiber	No Update to Provide	4/12/2010	
Jaguar Communications	Fixed Wireless	No Update to Provide	4/12/2010	
Johnson Telephone Company	DSL	No Update to Provide		
Lismore Cooperative Telephone Company	Fiber	No Update to Provide		
Lonsdale Telephone Company, Inc.	Fiber	No Update to Provide		
Loretel Systems, Inc.	DSL	No Update to Provide	4/14/2010	
Mabel Cooperative Telephone Company	DSL	No Update to Provide	4/7/2010	
Mediacom Communications Corporation	Backhaul	No Update to Provide	1/12/2010	
Mille Lacs Energy Cooperative	Fixed Wireless	No Update to Provide		
Minnesota Valley TV Improvement Corporation	Cable	No Update to Provide	4/13/2010	
New Ulm Telecom, Inc.	Cable	No Update to Provide	2/25/2010	
NorthfieldWiFi LLC	Fixed Wireless	No Update to Provide	2/4/2011	
Park Region Mutual Telephone Company	Fixed Wireless	No Update to Provide	3/18/2010	
Pine Island Telephone Company	DSL	No Update to Provide	4/14/2010	
Polar Telcom, Inc.	DSL	No Update to Provide	2/11/2010	
Polar Telcom, Inc.	Fiber	No Update to Provide	2/11/2010	
River Valley Telephone Coop.	Fixed Wireless	No Update to Provide	4/28/2010	
RRC Net	Fixed Wireless	No Update to Provide		
Runestone Telecom Association	DSL	No Update to Provide	4/14/2010	
Runestone Telecom Association	Fiber	No Update to Provide	4/14/2010	
Sacred Heart Telephone Company	DSL	No Update to Provide	2/5/2010	
Scott Rice Telephone Co.	DSL	No Update to Provide	2/15/2010	
Scott Rice Telephone Co.	Fiber	No Update to Provide	2/15/2010	
Sheehan Gas	Fixed Wireless	No Update to Provide		
Sioux Valley Rural Television, Inc.	Fixed Wireless	No Update to Provide	4/21/2010	
Sleepy Eye Telephone Company	DSL	No Update to Provide	4/14/2010	
Southern Cablevision, Inc.	Cable	No Update to Provide	3/30/2010	
Spacenet, Inc.	Satellite	No Update to Provide		
Spring Grove Cooperative Telephone Co.	Fiber	No Update to Provide	1/12/2010	
Starbuck Telephone Company	DSL	No Update to Provide	2/5/2010	

T-Mobile USA, Inc.	Backhaul	No Update to Provide	1/8/2010	
TDS Telecommunications Corporation	Backhaul	No Update to Provide	1/27/2010	
tw telecom of minnesota, llc	Backhaul	No Update to Provide	4/20/2010	
Upsala Cooperative Telephone Association	DSL	No Update to Provide	2/29/2012	
Upsala Cooperative Telephone Association	Fiber	No Update to Provide	2/29/2012	
US Internet of Minnetoka	Fixed Wireless	No Update to Provide	2/29/2012	
VAL-ED Joint Venture, LLP	DSL	No Update to Provide	4/21/2010	
Verizon Communications, Inc.	Backhaul	No Update to Provide	12/14/2009	
ViaSat, Inc.	Satellite	No Update to Provide	1/8/2010	
WideOpenWest Finance, LLC	Cable	No Update to Provide		[MAR-07-13 Brian Dudek] Change: WideOpenWest Finance, LLC acquired Knology; they are now a broadband provider for the state.
Wikstrom Telephone Company	DSL	No Update to Provide	4/12/2010	
Wikstrom Telephone Company	Fixed Wireless	No Update to Provide	4/12/2010	
Winnebago Cooperative Telecom Association	Fixed Wireless	No Update to Provide	6/17/2010	[FEB-13-13 Layne Wagner] I received notice from a company representative that they plan to discontinue the fixed wireless platform by Q2 2013.
Wolverton Telephone Company	DSL	No Update to Provide	6/22/2010	
Wolverton Telephone Company	Fiber	No Update to Provide	6/22/2010	
XO Communications, LLC	Backhaul	No Update to Provide	2/12/2010	
Zumbrota Telephone Company	DSL	No Update to Provide	2/5/2010	
Bradco-Wisp, Inc.	Fixed Wireless	No Update Provided – Use Last Submission Data		
City of Chaska	Fixed Wireless	No Update Provided – Use Last Submission Data		
Cogent Communications, Inc.	Backhaul	No Update Provided – Use Last Submission Data		
Enterpoint Wireless	Fixed Wireless	No Update Provided – Use Last Submission Data		
Windstream Communications	Backhaul	No Update Provided – Use Last Submission Data		
Zayo Group, LLC	Backhaul	No Update Provided – Use Last Submission Data		
Windstream Communications	DSL	Solicited Initial Data		
Reliance Globalcom Services, Inc.	Backhaul	Non-Responsive to Multiple Attempts		In addition to multiple contact attempts made during previous mapping submission periods, 5 contact attempts were made this period.

Submitted to:

National Telecommunications and Information Administration

Data Collection and Processing

Missouri
Broadband Data and Development

Submitted by:

GeoDecisions®
A Division of Gannett Fleming

MISSOURI

April 1, 2013

Table of Contents

1 Introduction

This document provides background for the ongoing data collection and processing phases of the Missouri Broadband Data and Development Project. It covers the initial processing of data to meet specific requirements defined by the National Telecommunications and Information Administration (NTIA), governed by the Notice of Funds Availability (NOFA) first published in volume 74, number 129, at page 32545 of the Federal Register and subsequently clarified in volume 74, number 154, at page 40569 of the Federal Register. It also covers the quality control aspects of the project, including back lab, field, and independent verification.

2 Non-Disclosure Agreement Development Process

The State Parties to the Non-Disclosure Agreement (NDA) process include the State of Missouri, the University of Missouri, GeoDecisions, and CBG Communications. Each party, along with the individual broadband service provider, is a signatory of each NDA.

A standard NDA was developed using an initial template provided by CBG, existing templates from providers, and was subsequently edited with inputs from all state parties. This NDA was then vetted with representatives from the Missouri broadband provider community in order to develop a data sharing document that reflected the concerns of both the state and industry.

The state drafted, signed, and distributed an initial letter to providers; including data collection guidelines and a draft of the standard NDA (see Attachment A). This letter was initially sent to 129 providers initially in late March 2010. Most partners to the NDA signed this initial NDA as provided. Some providers have asked for some changes to this NDA which then require legal review by all 5 parties to the agreement. These negotiations have taken some time to complete for individual providers.

We have also found that having a signed NDA does not ensure the State that data will be forthcoming as we have a few providers with signed NDAs that we have not received data for. These are still being pursued.

3 Identifying Providers

The state parties used multiple methodologies to: a) identify broadband providers potentially offering service in the State of Missouri, and b) to acquire contact information for each of the providers.

Identification of providers began by accessing the FCC's Form 477 publically available data. This data provides the Holding Company Name, the FCC registration number (FRN), and the filing company name of all broadband providers in the state that completed the Form 477. We began with this information and performed research tasks, including internet research of each of the companies to obtain a high-level contact within the company, as well as their phone and e-mail contact information. If some of this information was not obtainable via Internet research, CBG made initial contact with the company, primarily through phone, to further explore the most pertinent contact.

In addition, we performed research of various websites to determine if there are providers that had not filed a Form 477 with the FCC that should be included in the data collection process. We researched these companies again for the best contact information through various public records including, but not limited to, Missouri Public Service Commission databases, State Telecommunications Industry Association memberships, FCC Cable TV Community Unit and Physical System ID databases, FCC telephone company databases, business licenses, state and local tax records, etc., as well as various state, local and other departments and agencies, including Division of Corporations, Division of Revenue, Local Franchise Authorities, Chambers of Commerce, etc.

We also continue to identify additional potential providers during our field verification process. This list of potential providers is comprised of business names advertised (signage/trucks etc.), labeled infrastructure observed, or by mention from Missouri citizens through an interview.

As new providers are identified, the contact information is given to MU for delivery of initial contact letters to identified providers. These documents are mailed out by MU via e-mail, in order to expedite the process, and through the USPS as a formal notification. Based on input from providers in other states, these documents were sent by the State in order to show the importance that the State places on the project. All correspondence with the providers, including clarification of the NDA or Data Request, data formatting issues, and data submission by the providers, was then handled by GeoDecisions and CBG personnel unless the provider requested interaction with state personnel (ie. negotiation of NDA).

Due to the initial timeframe for completion (May 31, 2010) for Missouri's first version of the statewide map of broadband provision, the providers were requested to return the signed NDAs within five (5) business days of receipt and submit their data, in as usable a format as possible, by April 15, 2010.

The state parties performed follow-up with the providers on an as-needed basis. This included making contact with a provider if we did not hear from them after sending out the NDA and Data Request, following up to receive initial data sets, clarification regarding data sets, etc. Contact with the providers included phone calls, voicemail, and e-mail. In the case where a provider did not respond after numerous attempts, we also followed up with USPS mail as well as through their affiliated associations.

A spreadsheet was utilized to keep track of all contact information that was developed and contacts that were made to ensure the accuracy of each provider's pertinent contacts for the statewide project. These have been maintained as contacts and personnel change within the provider's industry.

4 Requested Data Format

The overarching goal of the data collection was to satisfy the requirements of the State Broadband Data and Development (SBDD) grant program, which is governed by the Notice of Funds Availability (NOFA) first published in volume 74, number 129, at page 32545 of the Federal Register and subsequently clarified in volume 74, number 154, at page 40569 of the Federal Register. Both the NOFA and subsequent discussions with the NTIA have indicated that time is of the essence, and strict deadlines are in place for the delivery of data to the NTIA. As such, timely,

accurate data collection is a primary concern. GeoDecisions requested that broadband providers submit data in a timely manner in whatever format the information was currently available to eliminate the lag that can be expected with the providers attempting to meet NOFA formatting compliance themselves; however, it was determined that many national providers, having gone through this process in other states, could deliver NOFA compliant data as part of their data submittal.

To assist in the NDA execution process and to further facilitate the timely delivery of data from the providers, GeoDecisions and CBG reviewed the State's NOFA cover letter. The cover letter provided a background on the project as well as contact information to project team members from the State, GeoDecisions, and CBG. The cover letter stressed the incredibly short initial project timeline and specified the requirement to collect this data on an ongoing basis – every 6 months.

In addition to the cover letter, GeoDecisions and CBG developed a separate attachment to the NDAs. This *Data Collection Guidelines* was reviewed by the State and provided further background and project goals associated with Missouri's State Broadband Data and Development project. The document also specified the guidelines to which the project would abide. The *Data Collection Guidelines* informed providers of the intended use of the data that they would be submitting. The intended uses included delivery of NOFA-compliant data to the NTIA, data dictionary, the intention of generating static maps, as well as the creation of a Missouri-specific interactive broadband mapping website. Finally, the *Data Collection Guidelines* specified the NOFA data and format standards that were required of the State for delivery to the NTIA.

GeoDecisions also developed a provider data request spreadsheet template document that was distributed upon request and allowed the providers to enter NOFA compliant data as they chose to do so. It included mock-up sample data as reference for their own data entry. GeoDecisions, under the guidance of the State, also developed a preliminary Missouri-centric web site that displayed census blocks, census tracts, counties, and major roads in order to assist providers in correlating their service areas to census blocks. Providers could access this site and zoom, pan and print census block maps as needed.

Spatial data was requested from the providers in the following hierarchy of data format preferences.

1) Shapefiles or Geodatabase (personal or file)
2) CAD files with embedded attributes included
3) Text-based data (MS Access, spreadsheets, comma-delimited files, etc.)
4) Paper maps
5) Any method in which the provider could readily submit the required data

5 Data Processing

Because of the variety of ways providers could submit their data, one of the major challenges of this project was to consolidate and then integrate this data into a common model. For each provider, the work was divided into three main steps:

1. Capture the supplied data into a provider-specific staging geodatabase

2. Process and QA features in the provider's staging geodatabase
3. Move the data from the provider's staging geodatabase into the final deliverable geodatabase model.
4. Final QA of all features and associated attribute data.

The first step was the most involved and time consuming. Regardless of the type of data provided, the base-level data (the 2010 census blocks, the 2010 TIGER street segments, and the county boundaries), all came from a single source, making it consistent across all providers. A number of different processes were developed for loading the staging geodatabase, depending on the type and form of data supplied. Each process was extensively documented through a process checklist to ensure accuracy and consistency. A description of these different processes used to load data into the provider specific staging geodatabase follows:

Availability Area

If a provider supplied their availability area as a single boundary or multiple boundaries drawn on a paper map or image file, those area(s) were geo-referenced and digitized into a shape file. If the boundary was provided as a CAD drawing or arose from another GIS system, it was also converted to a shape file format. Some wireless providers defined their area of availability as their wireless coverage area. This may be a supplied boundary, but it may also have been defined using the location of the wireless tower, the angle of coverage, and the coverage distance. This would result in a sector of a circle, which was then used as the availability area.

Once a shape file of the boundary was created, interpreted, and available, all census blocks intersecting that boundary were collected. Those census blocks less than two square miles were assembled into one feature class. For census blocks greater than two square miles, all street segments that overlapped both the census blocks and the availability area were collected into another feature class. Along with the availability area, the providers also supply the technology of transmission and speed information. These attributes were assigned to either the census blocks or street segments. Additional provider information including Name, DBA, and FRN, were also added as attributes.

Census Blocks

Some providers submitted a list of census blocks for their area of availability, along with technology of transmission and speed information specified for each census block. In these cases, the census block polygon was selected for each listed census block. If the census block's area was less than two square miles, it was added to the census block feature class and the technology of transmission and speed information were assigned from the provided list. If the census block's area was greater than two square miles, all street segments that overlapped it were added to the street segment feature class and the technology of transmission and speed information were assigned from the associated census block on the list.

The 2010 census block dataset was used for our data processing however a few providers submitted data using 2000 or 2009 vintage census blocks. When a provider submitted in a vintage other than 2010, the 2010 census blocks for the corresponding availability area were

coded for that provider. Thus the true coverage of the census blocks were maintained and consistent with the provider's list but represented in the 2010 block structure.

Address Information

If a list of addresses were provided as the availability area, the first step was to obtain the coordinates of these addresses. When geocoded successfully, this resulted in a point for each address located. The census blocks intersecting all the points were collected. If the block's area was greater than two square miles it was treated separately. If a census block contained address locations with different technologies of transmission, the census block was duplicated, and a distinct technology of transmission assigned to each duplicated census block. For different locations in a census block with the same technology of transmission, the maximum value for each speed was obtained and assigned to the census block.

If the geocoded point lay within a census block with an area greater than two square miles, the nearest street segment was located and the technology of transmission and speed was assigned to that segment. As with census blocks, if there were several locations with different technologies of transmission along the same street segment, the street segment was duplicated and each segment assigned a different technology of transmission. The speed assigned to that segment was the maximum speed for all locations along the segment sharing that segment's technology of transmission.

Wireless Boundary

In most cases, wireless providers supplied a boundary in electronic format or as a paper map. These were converted to a shape file either by digitizing or by performing a data conversion as appropriate. Some providers supplied tower locations, the angle of coverage, and the distance. In these cases the wireless boundary was constructed from this. Other providers defined their wireless boundary using an exchange boundary or as an aggregate of their customers. Although these boundaries may not accurately represent the wireless availability area, they were initially included in the dataset in order for the providers to submit feedback and more accurately specify boundaries of availability in future iterations. Finally, some wireless providers have recently taken advantage of websites offering wireless propagation service. Providers can enter key data into the site and a propagation raster image is developed more accurately representing their wireless availability. The output raster image is typically imbedded in a Google Earth format .kml or .kmz file which led to our team needing to create a new process flow.

Middle Mile Points

If middle mile points were supplied on a hardcopy or image file map, the point was digitized. Usually these points were provided with latitude and longitude, so it was a simple matter to add them to the feature class. The elevation data was not always supplied due to the provider not having this information available, but when it was, it was often given as feet above sea level. The model requires elevation to be feet above (or below) grade. In these cases, a digital terrain model was used to obtain the ground elevation at the middle mile structure location, which was subtracted from the height above sea level to obtain the height above grade.

The above processes were used to capture the provider-supplied data into provider-specific individual staging geodatabases using the current version of the common National States Geographic information Council (NSGIC) data model suggested for use by the NTIA. Once this was completed, the data could be updated or modified and Quality Checked (QC) using the same processes regardless of how it was originally submitted.
One such process was the creation of overview areas. The census blocks and street segments for a provider were collected and grouped by technology of transmission. County boundaries that overlapped each of these groups were then collected. The technology of transmission of all census blocks and street segments for the group was then assigned to the county. *The assignment of maximum speed within the group to the county has been discontinued per NTIA's request.*

At this point the dataset for a particular provider was complete. An extensive QC checklist was used to examine the dataset, verify consistency, and ensure that it matched the data submitted by the provider. Once the dataset has passed the quality check, the features were appended into final database model along with all data from other completed providers. Both the *Validate Topology* and *Validate Features* ESRI tools were run, any corrections necessary were made, and the tools were re-run until they processed without error. As individual provider data sets were appended into the master database and again when all data sets were appended, the NTIA supplied 'SBDD Check Submission' tool was also run against the data. Any errors detected were corrected and the tool re-run. A final manual QC review was performed to ensure that all the provider data is present and consistent. This was then followed by a final run of the SBDD Check Submission tool against the master data model to determine if any further corrections / changes were necessary.

Public Data Sources
The University of Missouri (UM) was in charge of the process to obtain and compile cable strand maps, as well as maps of service / coverage areas obtained from the service provider's public offices directly or from their Web sites and advertising materials. This was particularly true in cases where no other authoritative source was available for the given provider. Websites were collected and inventoried through the use of a 'surveymonkey' instrument to standardize and assemble the database from the webcrawling activities. All files and maps found through the webcrawling were then either imported, scanned, or screen-captured to create a digital representation or image of the associated service area. These files were then georeferenced to a common Missouri base map. The spatial transformation methodology used was determined by the image type, confidence in a real representation, and scale of source materials. In addition, maps of telephone company exchange areas and cable franchise areas from their respective associations were digitized and attributed to provide additional points of reference as well. These files were then held as elements of independent validation for the GeoDecision/CBG files created from Provider sources.

Community Anchor Institutions
The University of Missouri (UM) was lead on the development of the Community Anchor Institution database. Many elements of the Community Anchor Points were initially compiled by the UM in coordination with the Department of Public Safety (SEMA and OHS) providing a starting point for this data collection. The list of Anchor Institutions inventoried and monitored in this project include: Police, Fire, Hospitals, EOC, PSAPs, Municipal Courthouses, Libraries, K-12, Higher Education, Extension Offices, Correctional Facilities, Government Buildings, Community Centers, County Courthouses, and Armories.

The community anchor attribute information was gathered by the University through phone calling and site visits by UM students and staff. These efforts were coordinated with respective state agencies / associations with jurisdiction over these sites. For example, the State Fire Marshall's Office sent out a memo under their letterhead informing their constituency of the inventory and assessment so that the student callers and those conducting site visits would be received positively. UM also used their ongoing local data review, validation, and verification processes in partnership with Regional Planning Councils, Regional Homeland Security Oversight Committees, and associated local governments to assemble and verify data for some counties within Missouri. This process of data development had already been deployed in some areas of Missouri in association with the development and review of public safety structure-based information and has proven to work well.

6 Data Accuracy – Back Lab Verification Methods

Throughout the project, GeoDecisions and CBG performed numerous verification tasks to determine the level of accuracy of the information gathered from the broadband providers in the State. The initial verification methods were called back lab verification tasks by the NTIA. Unlike the field verification processes (described below), these tasks were performed in a lab or office setting. Each of the following GeoDecisions/CBG back lab processes was utilized to validate the data collected from some or all of the providers:

After the data from a given provider was captured into the geodatabase, the mapped data was then compared against information gleaned from various sources. The FCC had documentation that was used such as the Form 320 (Basic Signal Leakage Performance Report), which is filled out by cable television providers on an annual basis, and Cable TV Community Unit and Physical System databases. These information databases provided high-level information of geographic areas served by cable TV and other broadband providers. This information alerted our team to areas not included in gathered data from a broadband provider.

Additional sources of information utilized during the back lab verification process included franchise and exchange boundaries, cable strand maps, media prints, as well as business and taxation licenses. These sources varied in value to the project, depending on the level of information gathered and maintained by local franchising authorities and state agencies such as the PSC. Telecommunications associations were also queried for information regarding providers and system boundaries or areas of the state where specific providers offer service.

The above processes primarily relate to wireline broadband providers. For wireless broadband providers, we compared information gathered from the providers against FCC and FAA tower databases and private tower databases, as needed.

Independent Validation and Assessment: The UM also performed similar verification tasks as listed above to determine the level of accuracy and confidence in the information delivered by GeoDecisions/CBG as assembled from the broadband providers in the State. Again, these verification methods were called back lab verification tasks by the NTIA as these tasks were performed in a lab or office setting.

In addition to the above, the UM back lab processes took the assembled public sourced data for all providers (where this type of information could be found) and intersected it with the supplied GeoDecisions / CBG provider service areas. As well, Ookla site data, survey data, and presence/absence data assembled were also used to assess these data. From these data, additional analyses were performed to create measures of agreement, confidence indexes, spatial confidence indexes, and to visualize patterns of service and gaps in service.

These gaps and patterns of service are currently being examined to determine common threads for the State of Missouri across socio-economic, demographic, density of CAI, and other measurable elements of this mapping. We hope to use these data to inform the Regional Technology Planning Teams of opportunities and impediments.

The results of the independent assessment and validation were then combined with findings from GeoDecisions/CBG to form a report that then was delivered back to the provider to initiate the 'provider feedback' element (see Section 19 of this report) of the assessment and to validate/verify the assessments of these data and their extents by both UM and GeoDecisions/CBG with the respective provider.

7 Development / Implementation of a field verification guide and checklist

Prior to beginning field verification activities, CBG Communications, Inc. (CBG) worked with GeoDecisions to develope a field verification guide for use by each member of the field verification team. The guide included systematic instructions and a checklist related to verification of each broadband system and service type. The guide and checklist were drafted, reviewed and finalized prior to the beginning of field verification activities.

As we continue to move forward with each submission, our field verification efforts continue to advance. Provider data is used to determine higher success areas having overlapping or common areas as well as including providers not able to be thoroughly verified from prior rounds. Those areas are the initial focus, medium priority areas are determined using similar stepped-down criteria. Lower priority areas are for providers thoroughly verified in past rounds but current data is needed. This also includes locations in between the higher and medium priority areas. Provider data is loaded on laptops or Garmin units for use by field verification personnel.

8 Field verification team training

To ensure uniformity of the team's approach to field verification, field team training was held immediately prior to the beginning of field verification activities. Training was conducted for GeoDecisions, CBG, and University students and staff. The training covered all field verification activities, including:

- Use of the guide, instructions and checklist
- Understanding of each system and service types
- Understanding of coverage characteristics

- Understanding of service attributes, including system technology type, upstream and downstream connection speeds, and other attributes required (by the NTIA) to be documented and verified
- Use of the equipment needed for field verification activities
- Proper documentation of field verification activities

The office tutorial lasted ½ day. An additional field-based ½ day session was utilized for actual demonstration of field verification activities. New team members are trained in a similar manor.

9 Team Assignments

Two person teams were utilized the next 2 days after office and field training in order to work together and become more comfortable with the process. Eventually, field verification team members were expected to perform field verification activities on their own, with the exception of University student teams, who continued to participate in pairs of two for safety and security reasons. The State was divided into five (5) large areas encompassing Northwest, Northeast, Southwest, Southeast and Central Missouri. The contractor assembled ten (10) team members, and assigned two for each area. Initially the UM team assembled eight (8) team members to form four (4) teams, and assigned them to certain counties and particular census blocks within those counties. In subsequent iterations the UM team assembled 6 team members to form two (2) 2-3 person teams that reviewed targeted areas within counties and larger census blocks. As well, these teams conducted the surveys and interaction at the Missouri State Fair and other regional fairs as discussed in Section 13 of this report.

Each team member was provided an official-looking ID card and a letter of certification on Missouri State letterhead in order to mitigate findings early-on that residents were suspicious of individuals asking unsolicited questions. These two items proved very effective in minimizing these concerns.

10 Verifying Coverage

Broadband system coverage was verified by sampling whether services were available at various locations shown on the providers' system coverage maps randomly chosen from all of the census blocks that are at the ends of the providers' systems. The random sample was developed separately by the UM and contractor teams.

The contractor team initially verified availability by looking for a mixture of large and small providers across the state, being sure to hit each of the 19 Regions which would form the basis for the Regional Technology Planning Teams involved in the state broadband planning process. Efforts were made to locate and verify all providers that had submitted data. Verifying the large providers, especially, in each of these regions was a priority. Each contractor team member collected field gathered data in an MS Access database. The data included: Lat/Lon of verification point, provider name, technology type, speed test results if available, customer comments and notes from team member. All data was compiled and used to not only validate provider submitted data as mapped, but for providing feedback to the providers.

As a cross check, the UM team sampled a selection of counties, looking for more detailed coverage in a subset of the state's counties.

As we continue to move forward with each submission, our field verification efforts, as with all other aspects of the project, continue to advance. Providers are now categorized from prior verification rounds as unverified, high, medium or low priority. Unverified are new providers or one not able to be verified in previous attempts. High are providers with minimal verification in previous attempts. Medium are providers fairly thoroughly verified in previous verification and low are providers heavily verified in prior verification. Provider data is also used to determine highest provider concentration areas having overlapping or common areas. Those areas are the initial focus for unverified and high priority providers. Medium and lower priority providers and areas are secondary and my include locations between the unverified and high priority areas. Provider data is loaded on laptops or Garmin units for use by field verification personnel.

11 Ookla Speed Test Web Site

As part of the field verification process, State residents and businesses interviewed or visited were given a card briefly explaining the project and directed them to the State's designed speed test website. These cards were broadly distributed at the State Fair and other regional fairs as well. This has led to more responses on the Speed Test. This project specific Ookla speed test web site was set up to collect information on providers, users, as well as the upstream and downstream speeds associated with their broadband connection.

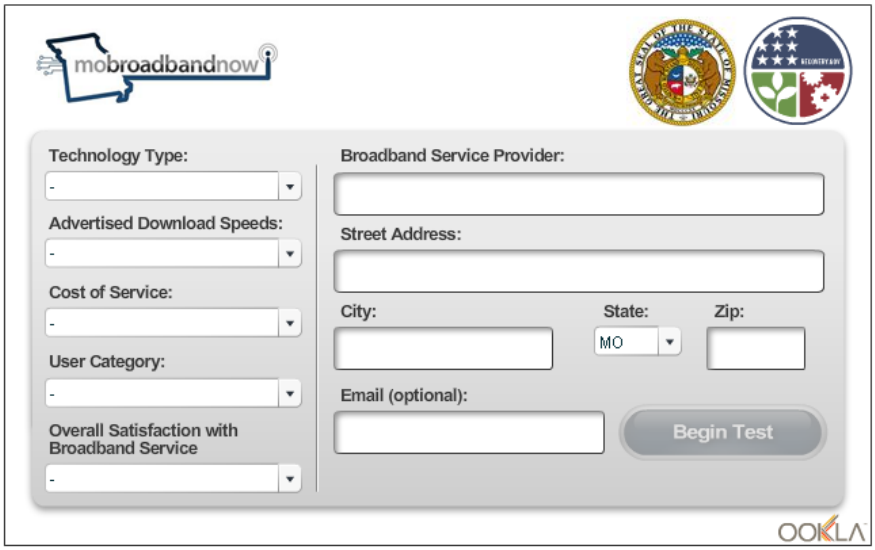


Figure 1: Depiction of Ookla Speed Test Site

12 Equipment Utilized for Field Verification Activities

Each team member carried the following equipment in order to perform field verification activities for the various types of services:

a. Laptop with Wi-Fi capability and provider GIS data installed
b. Cellular 3G/4G and WiMAX aircards (independent card for each provider) for use with laptop
c. Binoculars, as needed
d. GPS for verifying and documenting exact locations
e. Hardcopy forms and electronic database for documenting verification data
f. Cell phone with 3G or 4G used in lieu of laptop for certain types of wireless broadband services
g. Digital recorder for aural field notes, as needed
h. Identification documents (business cards, State or other ID badges, letter from the State acknowledging that the team member is part of the verification team, for those with questions)
i. Car chargers and/or DC to AC Inverters for equipment chargers
j. Census block maps (boundary details shown) and other maps as needed
k. Garmin GPS unit.
l. Postcards advertising the Ookla web site for distribution, as shown below

Figure 2: Postcards Distributed to Residents

13 Other Verification Methods

In addition to utilizing the above mentioned equipment and the methodologies listed below for verifying coverage and characteristics, team members entered into discussions with residents in the various areas. Residents were asked questions such as: Do they currently have broadband service?, Who their provider is?, If they know what speeds they could achieve, and if they knew of other provider's services being available in the area. This information needed to be confirmed by multiple residents before being considered accurate. Residents often did not know what their service level was nor what their speed of service was. Questions such as how much were they paying for the service led to a better understanding of their service level. Residents were encouraged to visit the Ookla speed test site to assist in gathering actual speed data. To date, over 8200 results have been received.

Missouri State Fair: In order to collect a large amount of information from Missouri residents for verification, the Broadband Mapping Team (BB Team) visited the Missouri State Fair in Sedalia, Missouri. The 2010 Missouri State Fair had an estimated attendance of over 330,000 people. With such a high attendance, it was determined that this event would be useful for data collection. For the 2012 Missouri State Fair, attendance exceeded that of the previous year, estimated at 330,000 to 350,000 attendees. The BB Team had two locations at the fair. The first was in the Mizzou Central Building in the MO-AG Theater organized by the College of Agriculture, Food and Natural Resources. This was the main location for the BB Team, where an informational slide show continuously played and signage was displayed throughout the booth area. At this location, Missouri residents were asked to fill out a survey regarding their internet service. A total of 699 surveys were completed at the 2011

Missouri State Fair, an increase of 117 surveys from the previous year, and were later geocoded to be used as verification and validation for UMs independent assessments.

The second BB Team location was on the lawn outside of the MO-AG Theater, where a Mizzou Tent was assembled daily and tables were set displaying a large Missouri map divided into four quadrants. Each of the four quadrants represented different regions of Missouri, northwest, northeast, southwest and southeast. At this station, Missouri residents were able to physically place a colored pin on their home location. The color of the pins was used to differentiate whether or not broadband was available. A total of 320 pins were placed by Missouri residents, denoting presence or absence of broadband. The 2010 Missouri State Fair pin total was 880, a difference of 560 pins down from the previous year due to severe weather that occurred two out of the four days the team was present at the fair.

In addition to the 2011 Missouri State Fair, the BB Team also visited three regional fairs and an extra state fair, the Boone County Regional Fair, Phelps County Regional Fair, the Shelby County Regional Fair and the Southeast Missouri District Fair in the city of Cape Girardeau. The three regional fairs, all located near the University, were chosen specifically to increase the amount of broadband data for the Mid-Missouri region. The Southeast Missouri District Fair was selected because the 2010 Missouri State Fair results displayed little or no data in the southeast Missouri region. In total, 1053 surveys were completed and approximately 390 pins were placed during this verification phase.

For 2012, the BB Team was deployed only to the Missouri State Fair in Sedalia. Unlike previous years, however, the BB Team was able to be present for every day of the event, which ran from Aug 09 to Aug 19. Thanks to favorable weather and the addition of new team members, the BB Team was also able to remain at the fair for more hours during each day, resulting in a significantly increased overall presence. By the end of the 2012 event, the team had collected 2,154 broadband surveys and Missouri residents had placed 1,090 presence/absence pins on the regional maps.

At all of the fairs, the broadband speed test cards for the Missouri Ookla site were handed out to residents after filling out a survey or placing a pin on one of the four maps. The BB Team also distributed drinking cups, refrigerator magnets, and pens with the State Broadband speedtest site on them.

In terms of verifying provider coverage, the state and regional fairs have provided valuable data that could not have been otherwise obtained. The color-coded push pin maps have been converted to point-based shape files. Combined with additional information collected from the fair attendees while interacting with the push pin maps, the resulting shape file has provided a statewide, grassroots survey of internet service provider, type of internet service (broadband, dial-up, etc.), technology of transmission, subscribed speed, and customer satisfaction. This data has been used in the verification process as a visual comparison to census block provider footprints. The results, so far, have been very positive and the fair points have displayed a high spatial correlation with the census blocks. More data collection will be required before this verification method can be formalized, but the results are very promising.

14 Verifying Wireline Broadband Coverage Characteristics

Using the specified random sampling technique, field team members searched for the physical endpoints of cable systems, telephone/DSL and fiber optic infrastructure and noted when additional infrastructure was not seen moving outward from the core either in an aerial (overhead) or underground manner. These areas were targeted for discussions with residents and to perform speed tests. Observations and findings were documented accordingly.

15 Wireless Broadband Coverage

Verification team members reviewed the provider's information and looked for network availability near the antenna site or in the middle of the provider's service area to confirm network and test equipment compatibility. Using the specified random sampling technique, the team member tested with pertinent gear to determine when service could and couldn't be achieved by the laptop, cell phone, or other wireless broadband-enabled device. These locations were documented accordingly.

16 Upstream and Downstream Connection Speeds for Wireline Providers

The field verification team member:

a. *For cable modem* – Upstream and downstream connection speeds were verified using the Ookla speed test at locations within the providers' coverage area using the specified random sampling technique. An already installed cable modem connection was utilized, as available. These included both preselected points with arrangements made for testing (such as at local libraries or at public facilities utilizing cable modem service) and at randomly chosen business and homeowner locations where the business or homeowner consented to test the service. Findings were documented accordingly on electronic or paper forms. In addition, the speed test was documented via the Ookla site.

b. *For DSL connection speed testing* –The same procedures were used as for cable modem testing. Findings were documented accordingly on paper or electronic forms.

c. *For fiber optic connection speeds* – For services to homes and small businesses the same procedures were used as above for cable modem and DSL. For higher speed services to larger businesses, institutional network connections, enterprise/wide area network connections, etc., the team member worked with the business or institutions' IT group to perform connection speed testing. If actual testing could not be performed, team members attempted to gain existing end user documentation tests and performance documentation related to speeds of the network. Findings were documented accordingly on paper or electronic reports.

17 Wireless Broadband Service Connection Speed Testing

For cellular broadband 3G and 4G testing – A provider specific air card was needed in order to enable the laptop to access the Ookla speed test to determine the speed of connection. Some service providers provided air cards to conduct this testing. All teams also used both personal and corporate cards to assist in the testing. The speed of connection was tested at randomly selected points beginning close to the providers' tower/antenna infrastructure, at a mid-point and then at the ends of the verified coverage area. Findings were documented accordingly on paper or electronic reports. Documentation was uploaded daily by the team members to ensure timely and uniform oversight and modifications of the processes.

The MU BB team also conducted a more detailed test of fixed mobile wireless coverage areas throughout Boone County using high-speed wireless broadband air cards. For wireless broadband testing purposes, the top five providers, AT&T, US Cellular, T-Mobile, Sprint/Virgin Mobile and Verizon were tested to understand how mobile broadband varies in different locations by collecting information such as: signal strength, speed, as well as the latitude and longitude coordinates of where the test was performed.

To gather upload and download speed information for each air card, the team members used the MOBroadbandNow Speed Test website on Ookla. During the speed testing it was not uncommon that the speeds varied at a specific point for each air card, therefore the air card was tested a total of three times for analysis and comparison. The signal strength was determined by how many "bars" were displayed for each provider. The bars would vary depending on if the team was in a mobile coverage area or not. The latitude and longitude coordinates were recorded using a GPS unit. The speed, signal strength, and coordinates were tested and recorded in ½ mile increments along selected urban and/or rural routes throughout Boone County.

Additional air card testing and verification was completed since the last submission in various counties such as: Howard, Callaway, Cooper, Moniteau, Cole, Morgan, Miller and Camden using specific provider footprints. For this testing method, random locations were chosen within the provider footprint and air cards were tested to see how each provider varied in strength and signal.

18 Coordination of Contractor and State Parties' Field Verification

The state and contractor utilized the process in the diagrams below to coordinate field verification activities:

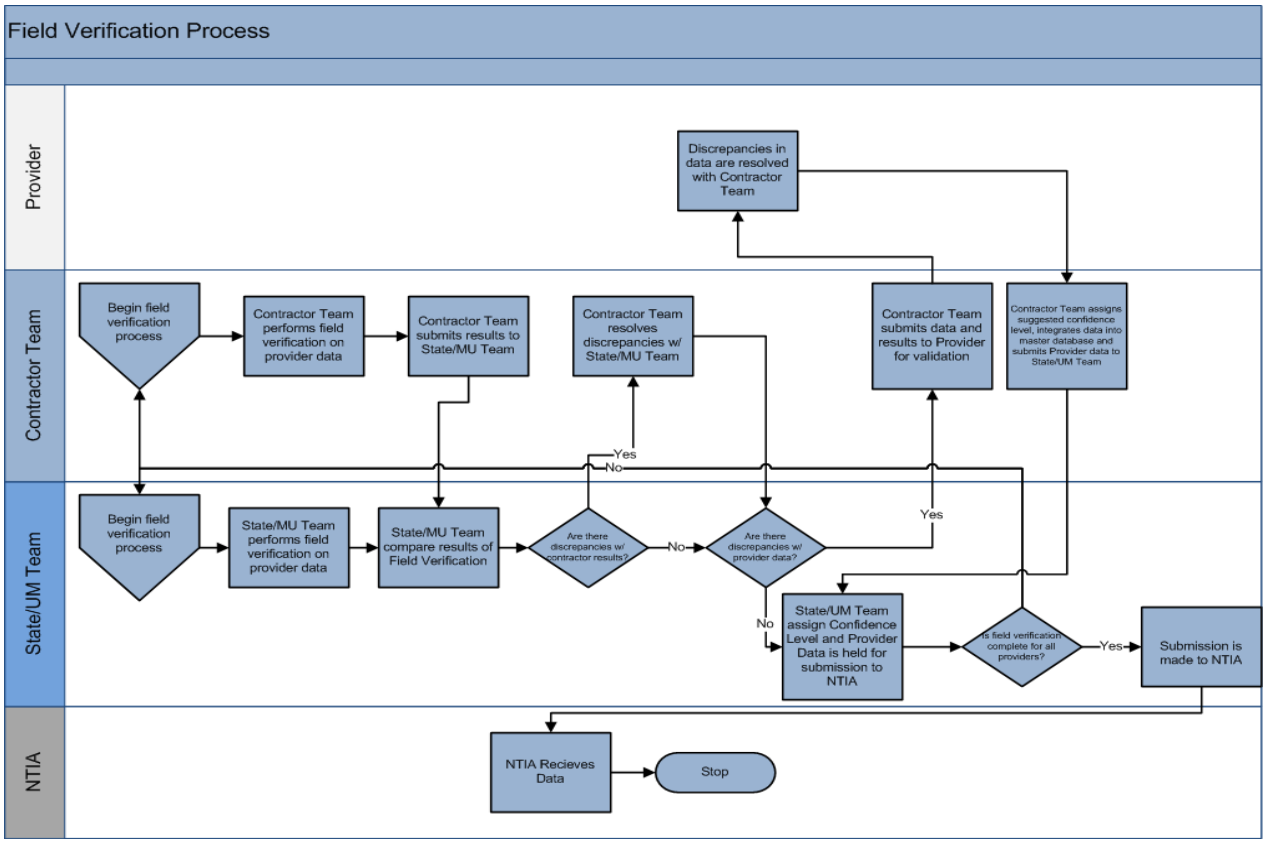


Figure 3: Field Verification Coordination Process

19 Provider Feedback Reporting

Upon completion of the provider submitted data, feedback information was supplied to each of the 101 providers that had submitted data as of Submission 5. This feedback was presented in the following forms:

1. A detailed Data Review Report in MS Word format,
2. All provider attribute data exported into MS Excel format, and
3. Multiple Overview, Wired and Wireless GIS exported image files in pdf format.

This information would allow each provider to review our validation findings, as well as check their submitted data as depicted in the GIS data model, both in a graphical and tabular form.

The Data Review Report detailed the usability and completeness of their submitted data as well as an estimate of our confidence in their submitted data based on field verification efforts and back lab verification steps as detailed above. The report also requested feedback on the accuracy of how we characterized their availability areas, technologies, speeds etc. Based on the provider's feedback, the data was adjusted and refined accordingly.

Field verification and back lab verification processes and procedures were utilized, as available and as needed, to ensure the highest level of confidence that the information gleaned from the providers was as accurate as possible. During this process, GeoDecisions contacted providers when we found instances that appeared to conflict with the information they initially provided and worked with the providers to adjust the maps accordingly.

20 Publications

MoBroadbandNow team conducted a statewide residential survey to assess the current Internet and broadband adoption and availability in 2011, whereby more than 76,400 residential surveys were mailed out and approximately 13 percent (9,825) of the surveys was returned and analyzed. Similarly, a survey of businesses and other targeted surveys of Missouri residents have been conducted. Data and information obtained through needs assessment (different surveys, and mapping activities) is being used to create a series of reports on specific broadband topics. The titles of the reports and their short description are as follows:

1. “Dissecting Missouri’s Digital Divide, An Analysis of Broadband Adoption” (June, 2012).

This is the first report in series and it analyses the data from MoBroadbandNow’s 2011 residential survey of broadband use. The report found that there is a broadband adoption gap of 19 percentage points between Missourians living in rural areas and those living in non-rural areas (63% of rural residents have adopted broadband, compared to 82% of non-rural residents).

Full report at: http://mobroadbandnow.com/initiatives/broadband-reports/digital-divide/

2. “Building Digital Inclusion: Broadband and Missouri’s Public Libraries” (October, 2012)

This is the second report in the MoBroadbandNow series and it discusses Missouri’s public libraries and their role in providing access to the Internet.

Full report at: http://mobroadbandnow.com/initiatives/broadband-reports/public-libraries/

3. “Understanding Internet Non-adoption: Fulfilling Missouri’s Digital Promise,” (Jan, 2013).

This is the third report in the series and will address the subject of technology non-adoption and explore reasons for non-adoption in Missouri’s regions and across different Missouri demographics. Gaining an understanding of the regions and demographics that lag in technology adoption and any specific reasons for this non-adoption are critical to future efforts by both government and Internet Service Providers (ISPs) to effectively reach non-adopters. This may include programs and promotions to address the disparity in computer and Internet technology adoption and availability in Missouri.

Full report at: http://mobroadbandnow.com/initiatives/broadband-reports/non-adoption/

4. “The Benefits of Expanded Broadband for Missouri Farms and Agribusinesses.” (October,

2011)

This report was a result of a collaboration with the Community Policy Analysis Center (CPAC) at the University of Missouri. This study was supported by the Missouri Internet Innovation Alliance (IIA) which is a national coalition of business and non-profit organizations committed to helping the country achieve universal broadband.

Full report at: http://mobroadbandnow.com/initiatives/agbroadbandnow/

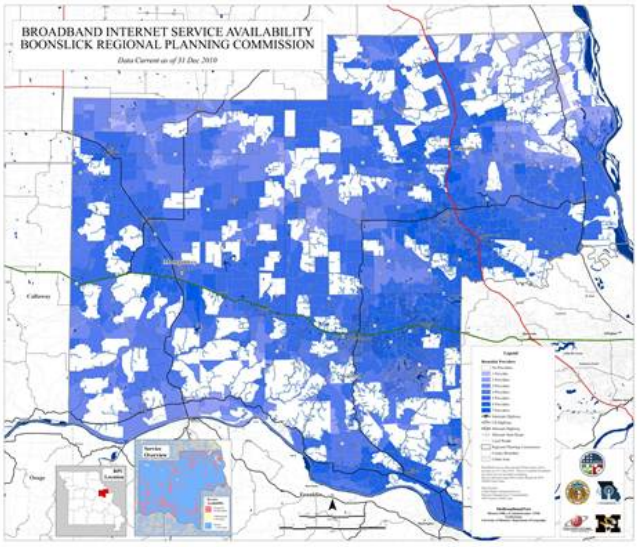
21 Mapping

MOBroadbandNow has developed several state mapping products from the data collected for NTIA submissions. These products, which primarily include maps of broadband service areas and maximum advertised speeds, have been well-received but MOBroadbandNow continues to make slight changes based on input from both broadband providers and Missouri residents. Initial attempts to provide statewide maps of broadband availability were directly derived from the data provided during each submission cycle and used the mapping standards set in place by NTIA. Those first steps provided a solid framework for future products, and the statewide broadband service dataset has since been used in conjunction with healthcare facilities, schools, and Congressional districts.

The most common concern of both Missouri residents and broadband providers during the early iterations of the state broadband mapping products was the representation of service availability at the census block level. In many cases, rural areas of Missouri appeared to be completely unserved by broadband because of the NTIA standard that census blocks greater than 2 sq. mi. be represented as road segments. Efforts were made to explain why the larger census blocks were represented as road segments, however complaints continued to be directed towards the MOBroadbandNow office.

In order to remedy these concerns, MOBroadbandNow determine that using the raw service footprints submitted by providers for state mapping products would allow for a more favorable mapping solution. Instead of using the submission data delivered to NTIA that is constrained by census blocks and road segments, MOBroadbandNow compresses all of the raw footprint shapefiles into a single shapefile. The process of combining the footprints of 100+ providers into a single file means that no single provider's service area can be harvested from the data, thus maintaining anonymity, but also provides a much more accurate representation of service boundaries.

Representation of broadband speed has recently been become a new area of concern. Missouri broadband providers have voiced complaints that the current distribution of speed tiers is not favorable to older transmission technologies that are inherently unable to achieve faster speeds. Further confusion has developed from the incompatibility between NTIA's speed tiers and the FCC definition of "broadband" as 4 Mbps download/1 Mbps upload.



Missouri broadband depicted using NTIA standard of only census blocks smaller than 2 sq mi.

Missouri broadband depicted using raw footprints as delivered by providers.

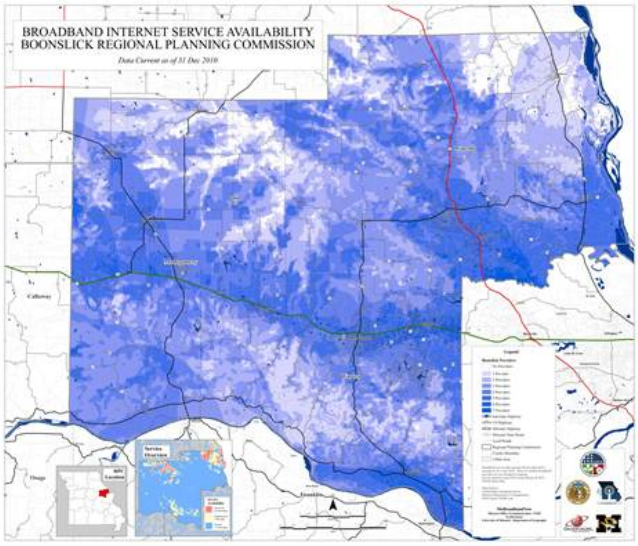


Figure 4: Side-by-Side Comparison of Broadband Service Mapping Methods

Unlike the concerns regarding the depiction of service areas, MOBroadbandNow has only a limited number of options to address issues with speed categories. MOBroadbandNow currently plans to produce two new series of speed maps from the April 01 2013 submission that depict only Maximum Advertised Download Speeds and only Maximum Advertised Upload Speeds. These new map series will be presented to select Missouri broadband providers for consideration.

22 Statistics

File Type	Number of Records
Total Records in all Files	**669,502**
Census Block < 2 sq. miles	477,549
Address-Level	Not Required
Street Segment	185,019
Wireless Shape File	87
BB Service Overview	597
Community Anchor Institution	5,332
Middle Mile	917
State Boundary	1
Metadata Provided for Geospatial Data	Yes
Number of ISP's Provided in Submission	113

Providers Completed	113
Pending Additional Data	14
Non-Responsive/Refused	20
Researching	57
Non-Facilities Based	83
Out of Business	8
TOTAL	295

Provider Name	Status	FRN	NDA Execution Date	Notes/Comments
Adams Networks	Data Included in Missouri State Submission	0011616356	5/18/2010	No response to Seventh data call.
Air Link Rural Broadband	Data Included in Missouri State Submission	0020854725	Not Req'd by Provider	Seventh data call updates included.
Alma Communications Company	Data Included in Missouri State Submission	0007196207	5/18/2010	No updates submitted in Seventh data call response.
Alsat Wireless	Data Included in Missouri State Submission	0021067509	8/3/11	Seventh data call updates included.
Holway Telephone Company	Data Included in Missouri State Submission	0004746863	4/5/2010	No updates submitted in Seventh data call response.
KLM Telephone Company	Data Included in Missouri State Submission	0003772274	4/5/2010	No updates submitted in Seventh data call response.
N. W. Communications	Data Included in Missouri State Submission	0003772290	4/5/2010	No updates submitted in Seventh data call response.
American Fiber Systems, Inc. – Zayo Group	Data Included in Missouri State Submission	0006651202	4/27/2010	No response to Seventh data call.
AT&T Corp.	Data Included in Missouri State Submission	0004496774	4/7/2010	Seventh data call updates included.
AT&T Mobility, LLC.	Data Included in Missouri State Submission	0004979233	4/7/2010	Seventh data call updates included.
AT&T Southwest	Data Included in Missouri State Submission	0016657918	4/7/2010	Seventh data call updates included.
Bay's Internet	Data Included in Missouri State Submission	0018912576	Not Req'd by Provider	No response to Seventh data call.
Big River Telephone, LLC	Data Included in Missouri State Submission	0018520320	Not Req'd by Provider	Seventh data call updates included.
BlueBird Network, LLC.	Data Included in Missouri State Submission	0018995944	Not Req'd by Provider	No response to Seventh data call.
Boycom Cablevision, Inc.	Data Included in Missouri State Submission	0007630791	Not Req'd by Provider	Seventh data call updates included.
Boycom Cablevision, Inc. – Partel Broadband Telecom Inc.	Data Included in Missouri State Submission	0020795449	Not Req'd by Provider	Seventh data call updates included.
Cable One, Inc.	Data Included in Missouri State Submission	0003474327	4/5/2010	Seventh data call updates included.
Cable America Missouri, LLC	Data Included in Missouri State Submission	0015466766	6/10/2010	Seventh data call updates included.
Carthage Water & Electric	Data Included in Missouri State Submission	0007147143	Not Req'd by Provider	No response to Seventh data call.
Suddenlink Communications – Cebridge	Data Included in Missouri State Submission	0014367650	6/12/2010	Seventh data call updates included.
Suddenlink Communications – Friendship Cable	Data Included in Missouri State Submission	0004999025	6/12/2010	Seventh data call updates included.
Suddenlink Communications – Cequel III Communications II	Data Included in Missouri State Submission	0009725870	6/12/2010	Seventh data call updates included.
CenturyLink	Data Included in Missouri State Submission	0018626853	4/20/2010	Seventh data call updates included.
Chariton Valley Telephone Corporation	Data Included in Missouri State Submission	0002549392	5/26/2010	Seventh data call updates included.
Chariton Valley Telecom Corporation	Data Included in Missouri State Submission	0008437147	5/26/2010	No updates submitted in Seventh data call response.
Charter Communications	Data Included in Missouri State Submission	0017179383	6/10/2010	Seventh data call updates included.
Citizens Telephone Company of Higginsville Missouri	Data Included in Missouri State Submission	0002504298	4/5/2010	No updates submitted in Seventh data call response.

LiNKCity	Data Included in Missouri State Submission	0016051450	Not Req'd by Provider	No updates submitted in Seventh data call response.
City Utilities Springfield (SpringNet)	Data Included in Missouri State Submission	0004759411	3/23/2011	No updates submitted in Seventh data call response.
Cogent Communications, Inc.	Data Included in Missouri State Submission	0019898303	Not Req'd by Provider	Seventh data call updates included.
Comcast	Data Included in Missouri State Submission	0004441663	5/27/2010	Seventh data call updates included.
Co-Mo Comm, Inc. (Co-Mo Connect)	Data Included in Missouri State Submission	0021854278	Not Req'd by Provider	Seventh data call updates included.
Clearwire	Data Included in Missouri State Submission	0017775628	Not Req'd by Provider	Seventh data call updates included.
CTC Wireless Internet	Data Included in Missouri State Submission	0017137431	Not Req'd by Provider	Seventh data call updates included.
Megapath Corporation	Data Included in Missouri State Submission	0003753753	5/18/2010	Seventh data call updates included.
Wireless Investments, LLC. (Easy Net)	Data Included in Missouri State Submission	0020526265	Not Req'd by Provider	Seventh data call updates included.
Craw-Kan Telephone	Data Included in Missouri State Submission	0002334225	4/5/2010	Seventh data call updates included.
T-Mobile	Data Included in Missouri State Submission	0006945950	5/4/2010	Seventh data call updates included.
Ellington Telephone Company	Data Included in Missouri State Submission	0003741956	4/5/2010	Seventh data call updates included.
FairPoint Communications Missouri, Inc.	Data Included in Missouri State Submission	0014710388	9/1/2010	Seventh data call updates included.
FairPoint Kearney	Data Included in Missouri State Submission	0004969697	9/1/2010	Seventh data call updates included.
Farber Telephone Company	Data Included in Missouri State Submission	0003748043	4/5/2010	No updates submitted in Seventh data call response.
BPS Telephone Company	Data Included in Missouri State Submission	0003730835	4/5/2010	Seventh data call updates included.
BPS Networks	Data Included in Missouri State Submission	0016026965	4/5/2010	No updates submitted in Seventh data call response.
Brown Dog Networks	Data Included in Missouri State Submission	0009254095	Not Req'd by Provider	No response to Seventh data call.
Fidelity Cablevision, Inc	Data Included in Missouri State Submission	0000013326	4/5/2010	Seventh data call updates included.
Fidelity Communications Services I, Inc.	Data Included in Missouri State Submission	0004351722	4/5/2010	No updates submitted in Seventh data call response.
Fidelity Telephone Company	Data Included in Missouri State Submission	0002550309	4/5/2010	No updates submitted in Seventh data call response.
Granby Telephone Company	Data Included in Missouri State Submission	0005061189	4/5/2010	No updates submitted in Seventh data call response..
Grand River Mutual Telephone Corp.	Data Included in Missouri State Submission	0002505519	4/7/2010	No response to Seventh data call.
Green Hills Technologies	Data Included in Missouri State Submission	0003736246	4/5/2010	No updates submitted in Seventh data call response.
Green Hills Telephone ILEC	Data Included in Missouri State Submission	0003736238	4/5/2010	No updates submitted in Seventh data call response.
Green Hills Telecommunications Services	Data Included in Missouri State Submission	0003736253	4/5/2010	No updates submitted in Seventh data call response.
Haug Communications, Inc.	Data Included in Missouri State Submission	0004711735	Not Req'd by Provider	No updates submitted in Seventh data call response.
Hughes Network Systems, LLC	Data Included in Missouri State Submission	0017434911	Not Req'd by Provider	Seventh data call updates included.
KC Coyote – Isotech	Data Included in Missouri State Submission	0014669097	Not Req'd by Provider	No response to Seventh data call.
KTIS (Kingdom Telephone Company)	Data Included in Missouri State Submission	0002212314	4/5/2010	No updates submitted in Seventh data call response.
Cricket Communications, Inc. (Leap Wireless International)	Data Included in Missouri State Submission	0002963528	4/20/2010	Late response to Seventh data call.
Le-Ru Telephone Co.	Data Included in Missouri State Submission	0002490472	4/7/2010	No updates submitted in Seventh data call response.
Level 3 Communications, LLC	Data Included in Missouri State Submission	0003723822	4/27/2010	No response to Seventh data call.
LTO Communications, LLC	Data Included in Missouri State Submission	0019008036	Not Req'd by Provider	No response to Seventh data call.
Mark Twain Communications Company	Data Included in Missouri State Submission	0002531879	4/5/2010	No response to Seventh data call.
Mark Twain Rural Telephone Co	Data Included in Missouri State Submission	0002549228	4/5/2010	No response to Seventh data call.
McDonald County Telephone Co	Data Included in Missouri State Submission	0002504058	4/5/2010	No updates submitted in Seventh data call response.
MCM Systems, LLC	Data Included in Missouri State Submission	0010662484	Not Req'd by Provider	Seventh data call updates included.
MCC Missouri LLC (Mediacom)	Data Included in Missouri State Submission	0005184247	9/1/2010	No updates submitted in Seventh data call response.
Mid States Services, LLC.	Data Included in Missouri State Submission	0018511303	5/26/2010	Seventh data call updates included.
MyChoice Network LLC	Data Included in Missouri State Submission	0000000000	Not Req'd by Provider	No updates submitted in Seventh data call response.
New Florence Telephone Company, Inc.	Data Included in Missouri State Submission	0004374047	4/5/2010	No updates submitted in Seventh data call response.
Northeast Missouri Rural Telephone Company	Data Included in Missouri State Submission	0004337044	4/20/2010	Seventh data call updates included.
Northwest Missouri Cellular	Data Included in Missouri State Submission	0002534618	Not Req'd by Provider	No updates submitted in Seventh data call response.
Oregon Farmers Mutual Telephone Company	Data Included in Missouri State Submission	0003733847	4/5/2010	No updates submitted in Seventh data call response.
New Wave Communications	Data Included in Missouri State Submission	0001202938	Not Req'd by Provider	No response to Seventh data call.
Iland Internet Services	Data Included in Missouri State Submission	0017606898	Not Req'd by Provider	Seventh data call updates included.
Otelco Mid Missouri LLC	Data Included in Missouri State Submission	0002509040	4/5/2010	No updates submitted in Seventh data call response.
Ozark Computers	Data Included in Missouri State Submission	0018658179	Not Req'd by Provider	No updates submitted in Seventh data call response.
Peace Valley Telephone Co., Inc.	Data Included in Missouri State Submission	0018539742	4/5/2010	Seventh data call updates included.
Poplar Bluff, City of	Data Included in Missouri State Submission	0002514529	Not Req'd by Provider	Seventh data call updates included.
ProTronics Technologies, Inc.	Data Included in Missouri State Submission	0010790061	Not Req'd by Provider	No response to Seventh data call.
Radio Wire, Inc.	Data Included in Missouri State Submission	0018912626	Not Req'd by Provider	No response to Seventh data call.
Ralls Technologies (Ralls County Electric Cooperative)	Data Included in Missouri State Submission	0018539916	Not Req'd by Provider	No updates submitted in Seventh data call response.
Midwest Data Center – Subsidiary of Rock Port Telephone	Data Included in Missouri State Submission	0004362505	4/7/2010	No updates submitted in Seventh data call response.
Rock Port Cablevision	Data Included in Missouri State Submission	0004362505	4/7/2010	No updates submitted in Seventh data call response.
Goodman Telephone Company, Inc.	Data Included in Missouri State Submission	0004269775	4/12/2010	No updates submitted in Seventh data call response.
Ozark Telephone Company	Data Included in Missouri State Submission	0004269817	4/12/2010	No updates submitted in Seventh data call response.
Seneca Telephone Company	Data Included in Missouri State Submission	0004269809	4/12/2010	No updates submitted in Seventh data call response.
Sho-Me Technologies, LLC	Data Included in Missouri State Submission	0008875890	Not Req'd by Provider	No updates submitted in Seventh data call response.
Skycasters	Data Included in Missouri State Submission	0018756155	Not Req'd by Provider	No updates submitted in Seventh data call response.
Socket Telecom, LLC	Data Included in Missouri State Submission	0008515595	Not Req'd by Provider	No response to Seventh data call.
Sprint Nextel Corporation	Data Included in Missouri State Submission	0003774593	6/11/2010	Seventh data call updates included.
StarBand Communications Inc.	Data Included in Missouri State Submission	0005087457	4/5/2010	No updates submitted in Seventh data call response.
Steelville Telephone Exchange Inc	Data Included in Missouri State Submission	0002549665	4/5/2010	No response to Seventh data call. Adjusted existing data.
Miller Telephone Company	Data Included in Missouri State Submission	0004269528	4/5/2010	No updates submitted in Seventh data call response.
TDS Telecommunications Corporation – Stoutland	Data Included in Missouri State Submission	0002502243	4/26/2010	Seventh data call updates included.
TDS Telecommunications Corporation – New London	Data Included in Missouri State Submission	0002529733	4/26/2010	Seventh data call updates included.
TDS Telecommunications Corporation – Orchard Farm	Data Included in Missouri State Submission	0003767340	4/26/2010	Seventh data call updates included.
Time Warner Cable	Data Included in Missouri State Submission	0013430244	6/21/2010	Seventh data call updates included.
Total Highspeed Internet Service	Data Included in Missouri State Submission	0017633405	Not Req'd by Provider	Seventh data call updates included.
Townes Tele-Comm, Inc. – Choctaw Telephone Company	Data Included in Missouri State Submission	0004928792	Not Req'd by Provider	No updates submitted in Seventh data call response.
Townes Tele-Comm, Inc. – MoKan Dial, Inc.	Data Included in Missouri State Submission	0004928750	Not Req'd by Provider	No updates submitted in Seventh data call response.
Tw telecom	Data Included in Missouri State Submission	0017348061	4/27/2010	Seventh data call updates included.
United Services, Inc. (United Sky Wireless)	Data Included in Missouri State Submission	0016087876	4/5/2010	No updates submitted in Seventh data call response.
Verizon Wireless – Cellco Partnership	Data Included in Missouri State Submission	0003290673	5/26/2010 & 7/19/2012	Seventh data call updates included.
WildBlue Communications, Inc.	Data Included in Missouri State Submission	0007843766	5/4/2010	No updates submitted in Seventh data call response.
Windjammer Communications LLC	Data Included in Missouri State Submission	0017915182	Not Req'd by Provider	No response to Seventh data call.
Windstream Corporation	Data Included in Missouri State Submission	0014400220	6/10/2010	Seventh data call updates included.

YHTI	Data Included in Missouri State Submission	0014205504	4/5/2010	Seventh data call updates included.
Lathrop Telephone Company	Data Included in Missouri State Submission	0003737376	4/7/2010	No response to Seventh data call.
NPG Cable, Inc. (Suddenlink)	Data Included in Missouri State Submission	0002508687	Not Req'd by Provider	Seventh data call updates included.
United States Cellular Corporation	Data Included in Missouri State Submission	0004372322	8/21/2010	Seventh data call updates included.
Video Direct Satellite & Entertainment	Data Included in Missouri State Submission	0021009246	Not Req'd by Provider	Seventh data call updates included.
WIFI Midwest, Inc.	Data Included in Missouri State Submission	0018247908	Not Req'd by Provider	Seventh data call updates included.
Wisper ISP Inc.	Data Included in Missouri State Submission	0016278970	Not Req'd by Provider	Seventh data call updates included.
Blue Sky Technologies	Compiling Data – No Data Submitted		Not Req'd by Provider	No source data received to date.
KC Web Internet Services, LLC	Compiling Data – No Data Submitted	0011513751	Not Req'd by Provider	No source data received to date.
KEI Internet Service	Compiling Data – No Data Submitted	0000000000	Not Req'd by Provider	No source data received to date.
Wisper ISP, INC	Data Included in Missouri State Submission	0016278970	Not Req'd by Provider	Seventh data call updates included.
AccuBak Data Systems, Inc.	Data Compiled But Not Submitted By Provider	0018543744	Not Req'd by Provider	Owner still having trouble seeing the benefit to submitting data.
Ritter Cable Corporation	NDA Fully Executed – No Data Submitted	0014054449	4/20/2010	No source data received to date.
IAMO Telephone Company	NDA Fully Executed – No Data Submitted	0014067565	4/7/2010	No source data received to date.
SureWest Kansas, LLC – Everest Midwest LLC	NDA Fully Executed – No Data Submitted	0004069035	4/12/2010	No source data received to date.
Blue Mule Wireless	Data Not Submitted By Provider	0000000000	Not Req'd by Provider	No source data received to date.
TA Highspeed	Data Not Submitted By Provider	0000000000	Not Req'd by Provider	No source data received to date.
Tower Internet	Data Not Submitted By Provider	0000000000	Not Req'd by Provider	No source data received to date.
US Cable of Coastal-Texas, L.P.	Data Not Submitted By Provider	0000000000	Not Req'd by Provider	No source data received to date.
Crystal Broadband	Data Not Submitted By Provider	0000000000	Not Req'd by Provider	No source data received to date.
Finally Broadband, LLC.	Working Toward Signed NDA			Not fully operational as of 8/31/11
Iowa Telecommunications Services, Inc.	Non-Responsive	0003911385		
Mo-Ark Communications – (Wasp Wireless)	Non-Responsive	0004376919		NDA Sent
CorpraNet	Non-Responsive			NDA Sent
Cox Communications	Non-Responsive			NDA Sent
True Broadband Networks	Non-Responsive			No answer at phone numbers and e-mails kick-back
Enventis Telecom Inc.	Non-Responsive	0008394322		NDA Sent
Dexter Broadband	Non-Responsive		NA	Phones disconnected and e-mails are unanswered
St Joe Wireless	Non-Responsive	0002545929		Attempting to make initial contact.
First Cable of MO (Mississippi Valley)	Non-Responsive			
Galactic Broadband	Non-Responsive			No contact information found
SES Americom	Non-Responsive			Attempting to make initial contact.
Verizon Business Global LLC dba Verizon Business	Non-Responsive	0010856284		Submitted data with wireless company only.
Momentum	Non-Responsive			
Mid Missouri Broadband & Cable LLC	Non-Responsive			
St Louis Broadband	Refused to participate at this time			Does not see benefit
Birch Telecom of Missouri, Inc.	Refused to Participate	0003732294	NA	Refuse to sign NDA or participate
Ionex Communications, Inc.	Refused to Participate	0005027453	NA	Refuse to sign NDA or participate - Birch Communications
Pixius Communications	Refused to Participate	0010480176	NA	Refuse to sign NDA or participate at this time
Poplar Bluff Internet, Inc (SEMO)	Refused to Participate	0013662408	NA	Refuse to sign NDA or participate at this time
Semo Communications Inc.	Refused to Participate	0003788775	NA	Poplar Bluff Internet - refuse to sign NDA or participate at this time
NuVox, Inc.	Researching - Acquired By Windstream	0004319414	6/10/2010	No source data received to date.
Stouffer Communications	Researching - Included as Granby Telephone	0005061189		
CenturyTel Fiber Co. II, LLC dba LightCore, a CenturyTel Co	Researching Included in CenturyLink submission	0008612293	4/20/2010	
Falcon Cablevision	Researching Acquired By Charter Comm		NA	Data included in Charter submission.
New Cingular Wireless Services, Inc.	Researching – Purchased by AT&T	0003766532	4/7/2010	Included in AT&T submissions
Battles Xtreme Network	Researching To Determine If Broadband Provider			
Little River Cabel and Woodall Wireless	Researching To Determine If Broadband Provider			
City Light Gas & Water Office – City of Kennett	Researching To Determine If Broadband Provider			
City of Marshall	Researching To Determine If Broadband Provider			
Fidelity Communication Services II, Inc.	Researching To Determine If Broadband Provider	0005918503	4/5/2010	Researching inclusion with other Fidelity Provider submissions.
Fidelity Networks, Inc.	Researching To Determine If Broadband Provider	0004312963	4/5/2010	Researching inclusion with other Fidelity Provider submissions.
Google Fiber	Researching To Determine If Broadband Provider			Fiber available in MO in Spring of 2013
Excel Telecommunications – SureWest	Researching To Determine If Broadband Provider		4/12/2010	
TDS Metrocom	Researching To Determine If Broadband Provider		4/26/2010	Researching inclusion with other TDS Provider submissions.
TDS Missouri	Researching To Determine If Broadband Provider		4/26/2010	Researching inclusion with other TDS Provider submissions.
Telephone and Data Systems	Researching To Determine If Broadband Provider		4/26/2010	Researching inclusion with other TDS Provider submissions.
Aurora Communications, Inc.	Researching To Determine If Broadband Provider	0015696180	4/5/2010	Researching inclusion with other YHTI Provider submissions.
Full Stream Wireless	Researching To Determine If Broadband Provider			
Broadview Networks Holdings, Inc.	Researching To Determine If Broadband Provider	0010296853		
Broadwing Communications, LLC	Researching To Determine If Broadband Provider	0008599706	4/27/2010	Researching inclusion with other Level 3 Provider submission
WilTel Communications, LLC.	Researching To Determine If Broadband Provider	0003716511	4/27/2010	Researching inclusion with other Level 3 Provider submission
AT&T Services, Inc.	Researching To Determine If Broadband Provider	0008644056	4/7/2010	Researching inclusion with other AT&T Provider submission.
Advanced Digital LLC	Researching To Determine If Broadband Provider			
BMU Internet	Researching To Determine If Broadband Provider			
Computer Magic Internet LLC	Researching To Determine If Broadband Provider			
DNG Electronics	Researching To Determine If Broadband Provider			
Extreme	Researching To Determine If Broadband Provider			
Green City Electric Utility	Researching To Determine If Broadband Provider			
Human Span	Researching To Determine If Broadband Provider			
Insight Cable	Researching To Determine If Broadband Provider			
Jaguar Technologies Inc (JagTec)	Researching To Determine If Broadband Provider			
Jobe Internet Services	Researching To Determine If Broadband Provider			
Keno Telephone	Researching To Determine If Broadband Provider			
LocalNet	Researching To Determine If Broadband Provider			
MCM System Wireless	Researching To Determine If Broadband Provider			
MHE Net	Researching To Determine If Broadband Provider			
Midwest Internet Technologies (MITI)	Researching To Determine If Broadband Provider			
Midwest Telecommunications	Researching To Determine If Broadband Provider			

Mist Valley	Researching To Determine If Broadband Provider			
Momentum	Researching To Determine If Broadband Provider			
MoreNet	Researching To Determine If Broadband Provider			
NetZero	Researching To Determine If Broadband Provider			
North Missouri Internet Services	Researching To Determine If Broadband Provider			
Optimum Cablevision	Researching To Determine If Broadband Provider	0003301363		
Pacific Wireless Internet	Researching To Determine If Broadband Provider	0018044297		
PIP Internet	Researching To Determine If Broadband Provider			
Primary Networks	Researching To Determine If Broadband Provider			
Regis	Researching To Determine If Broadband Provider			
Sikeston Internet	Researching To Determine If Broadband Provider	0018375808		
Suddenlink Communications - Cequel Communications	Researching To Determine If Broadband Provider	0015784663	6/12/2010	
Superior Cable	Researching To Determine If Broadband Provider			
Tri-Lakes Internet	Researching To Determine If Broadband Provider			
Turbo Net	Researching To Determine If Broadband Provider			
Utopian Wireless Corporation	Researching To Determine If Broadband Provider			
United Electric	Researching To Determine If Broadband Provider			
Vaughn's Computer Central	Researching To Determine If Broadband Provider	0019846674		
Wave Internet Technologies LLC	Researching To Determine If Broadband Provider	0020090023		
Access US	Not Facilities Based			
Board of Municipal Utilities	Not Facilities Based	0016073389		Discontinued offering service
McLeodUSA Telecommunications Services, Inc. (PaeTec)	Not Facilities Based	0003716073	NA	
XO Communications, LLC	Not Facilities Based	0006275945	NA	
Telnet Worldwide	Not Facilities Based		NA	
Terre Star	Not Facilities Based		NA	
TMC Communications	Not Facilities Based		NA	
TracFone	Not Facilities Based		NA	
Sofnet	Not Facilities Based		NA	
Clear Communications, Inc.	Not Facilities Based			Equipment seller
Superfone Inc.	Not Facilities Based	0008402202		
Tritel	Not Facilities Based		NA	
Missouri Broadband	Not Facilities Based		NA	
Mobilcom Pittsburg, Inc.	Not Facilities Based	0002324465	NA	
PneumaTek	Not Facilities Based		NA	Not responding to email
City of Newburg	Not Facilities Based		NA	
Qwest Communications Company, LLC	Not Facilities Based	0003605953	NA	
South Holt Cablevision	Not Facilities Based		NA	Offer Internet through Oregon Farmers Mutual Telephone Co
ADC	Not Facilities Based		NA	
Adva Optical Networking North America, Inc.	Not Facilities Based		NA	
AFL Communications	Not Facilities Based		NA	
Aircell	Not Facilities Based		NA	
Airdis Telecom	Not Facilities Based		NA	
Airespring, Inc.	Not Facilities Based	0006875322	NA	
ANPI	Not Facilities Based		NA	
Arch Communications	Not Facilities Based		NA	
Atlantis Holdings LLC	Not Facilities Based	0018587402	NA	
Bluegrass Cellular	Not Facilities Based		NA	
Boost Mobile	Not Facilities Based		NA	
Broadband National	Not Facilities Based		NA	
BullsEye Telecom, Inc.	Not Facilities Based	0004350930	NA	
Cellular one	Not Facilities Based		NA	
CHR Solutions	Not Facilities Based		NA	
Charles Industries	Not Facilities Based		NA	
Chillicothe Municipal Utilities	Not Facilities Based	0004192225	NA	
City of Newburg	Not Facilities Based		NA	
Cooperative Communications, Inc.	Not Facilities Based		NA	
Curt's Custom Cable	Not Facilities Based		NA	
DeSoto ISP	Not Facilities Based		NA	
Digital Landing	Not Facilities Based		NA	
DirecTV	Not Facilities Based		NA	
DSL,net, Inc. (Megapath)	Not Facilities Based	0004324851	NA	
Earthlink	Not Facilities Based		NA	
Extel	Not Facilities Based		NA	
Freedom Communications	Not Facilities Based		NA	
GlobalNet	Not Facilities Based		NA	
Golden State Cellular	Not Facilities Based		NA	
Granite Telecommunications	Not Facilities Based		NA	
Illinois Valley Cellular	Not Facilities Based		NA	
Innovative Systems	Not Facilities Based		NA	
Interglobe Communications, Inc.	Not Facilities Based	0005156229	NA	
Inter-Linc	Not Facilities Based		NA	
Jitterbug	Not Facilities Based		NA	
LightEdge Solutions, Inc.	Not Facilities Based	0015546443	NA	
Logix Communications	Not Facilities Based		NA	
Metropolitan Telecommunications Holding Company	Not Facilities Based	0009806019	NA	
Mid America Computer Corporation	Not Facilities Based		NA	
Mohave Wireless	Not Facilities Based		NA	
Netlogic, Inc.	Not Facilities Based	0006825954	NA	
New Edge Holding Company	Not Facilities Based	0003720471	NA	

Nex-Tech Wireless	Not Facilities Based		NA	
Nortel Solutions	Not Facilities Based		NA	
Open Range	Not Facilities Based		NA	
OFS	Not Facilities Based		NA	
Pacific Wireless	Not Facilities Based		NA	
Preferred Long Distance	Not Facilities Based		NA	
Protel	Not Facilities Based		NA	
Pulse Broadband	Not Facilities Based		NA	Reseller for Ralls Tech.
SkyTerra Communications	Not Facilities Based		NA	
SkyWay USA	Not Facilities Based		NA	
Spirit Telecom	Not Facilities Based		NA	
Stutler Technologies Corp	Not Facilities Based		NA	
Tablerock Net	Not Facilities Based		NA	
TCO Network, Inc.	Not Facilities Based		NA	
TCS Telecom, Inc.	Not Facilities Based		NA	
Telefonica Data Corp SA	Not Facilities Based	0018547828	NA	
Tellabs	Not Facilities Based		NA	
Toast.Net	Not Facilities Based		NA	
Tranquility Internet	Not Facilities Based		NA	
Video Direct	Not Facilities Based		NA	
Vonage	Not Facilities Based		NA	
Zone Telecom, Inc.	Not Facilities Based		NA	
WestLink	Not Facilities Based		NA	
Aero-Surf Wireless Internet	Out of Business			Appear to be out of business
Almega Cable	Out of Business		Not Req'd by Provider	Phone number no longer in service. Out of business?
Longview Cable and Data, LLC.	Out of Business	0013948609	NA	Sold off Assets
Total Wireless Communications	Out of Business	0018726729	Not Req'd by Provider	Acquired by Total Highspeed Internet Services
Missouri Network Alliance	Out of Business	0015540669	Not Req'd by Provider	Acquired by BlueBird Network
Worldcom Broadband Solutions	Out of Business		NA	
Global Crossing Telecommunications, Inc.	Out of Business	0002850519	NA	
Sikeston Board of Municipal Utilities	Out of Business	0016073389	NA	

Attachment A

NONDISCLOSURE AGREEMENT

THIS NONDISCLOSURE AGREEMENT ("Agreement"), dated and effective as of _____, 2010, is made by and among the Parties to this Agreement, which are _____including its affiliates (collectively referred to hereinafter as "the Company"), and the State of Missouri, Office of Administration ("OA"), The Curators of the University of Missouri on behalf of the University of Missouri - Columbia ("MU"), GeoDecisions, a Division of Gannett Fleming, Inc. ("GeoDecisions"), and CBG Communications, Inc. ("CBG") (collectively referred to hereinafter as "the State Parties," except where otherwise indicated.)

WHEREAS:

I. The National Telecommunications and Information Administration (NTIA) has made available a grant program to fund broadband mapping known as the State Broadband Data and Development (SBDD) grant program, which is governed by the Notice of Funds Availability (NOFA) first published in volume 74, number 129, at page 32545 of the Federal Register and subsequently clarified in volume 74, number 154, at page 40569 of the Federal Register, both of which are incorporated fully herein; and

II. Both OA and MU have partnered with the mapping entities, GeoDecisions and CBG, to implement the SBDD grant program; and

III. The Company possesses confidential and proprietary information necessary to such implementation and acknowledges that it desires to share certain of that information with the State Parties and with the NTIA; and

IV. When the Company shares that information with the State Parties, the confidential and limited use conditions of this Agreement shall apply; and

V. Missouri law allows governmental entities to close records that: 1) relate to scientific and technological innovations in which the owner has a proprietary interest pursuant to §610.021(15); and 2) fall within the definition of "trade secret" pursuant to the Uniform Trade Secrets Act, §417.450, RSMo.; and 3) have been submitted to an institution of higher education in connection with a proposal to license intellectual property or perform sponsored research and which contains sales projections or other business plan information the disclosure of which may endanger the competitiveness of a business, §610.021(22) ; and

NOW THEREFORE, the Parties agree as follows:

TERMS:

a) "Confidential Information" shall be defined in identical terms to the SBDD NOFA and any subsequent SBDD NOFA Clarification(s).

b) All Confidential Information received by the State Parties from the Company may be used as follows:

i) The State Parties may use the Company's information to derive maps, interactive websites and tabular data representations of the Company's broadband coverage area, network information, coverage attributes, and such other uses as may be required to implement the SBDD, referred to as the State Parties' Work Product; and

ii) The State Parties may, at a given location, estimate broadband coverage and identify broadband providers within the associated census block or estimated area, including Company, if applicable; and

iii) That State Parties may provide the NTIA with any such State Works as may be reasonably required by the terms and conditions as outlined in any applicable NOFA. The Company acknowledges that such provision may likely result in the disclosure of Confidential Information to governmental authorities and that, once such disclosures are made by the State Parties as required by a Project, the State Parties

1

Figure 5: Standard NDA pg 1

are fully released from any liability for the actions of the third party governmental authority regarding the disclosure, sharing or use of such Confidential Information; and,

iv) The State Parties may use the Confidential Information in any other way to the extent such use is consistent with this Agreement and the SBDD program, that does not result in disclosing it, and

v) The Company waives any claims of ownership to the State Parties' Work Products.

c) Per the terms of this Agreement, the State Parties will protect Confidential Information provided to it from any use, distribution or disclosure pursuant to §610.021 (14), (15) and (22) and §417.450, RSMo, except as permitted herein.

d) Confidential Information provided to Recipient in written or other tangible or electronic form shall be marked by Company with a confidential and proprietary notice prior to receipt by the State Parties.

e) Parties acknowledge that any discrepancy between the SBDD NOFA and the terms provided for herein shall be resolved in favor of the SBDD NOFA. Nothing contained herein shall be construed to limit the State Parties' reporting and data sharing obligations under the SBDD NOFA, including sharing of Company's Confidential Information with NTIA pursuant to the terms of the SBDD NOFA and Clarification.

f) The State Parties may provide Confidential Information only to those employees, consultants, independent contractors and agents who:

i) Have a substantive need to know such Confidential Information in connection with the State Parties' Work Product;

ii) Have been advised of the confidential and proprietary nature of such Confidential Information; and

iii) Have agreed in writing prior to disclosure to protect from unauthorized disclosure all confidential and proprietary information to which they have access in the course of their participation in the creation of the State Parties' Work Product in accordance with all the terms of this Agreement.

g) Confidential Information does not include information the State Parties lawfully obtain from any source other than Company, provided that such source lawfully disclosed such information.

h) If the State Parties are required to provide Confidential Information to any court, government agency or third party pursuant to written court order, subpoena, Missouri Sunshine Law request, or other process of law, they must provide the Company with prompt written notice of such requirement or request and cooperate with the Company to protect against or limit the scope of the disclosure.

i) All Confidential Information remains at all times the Company's property. Any State Party Recipient may make tangible or electronic copies and notes of Confidential Information only as necessary for use as authorized herein. All such copies or notes must be marked with the same confidential and proprietary notice as appears on the original. All such copies will be destroyed when the State Parties' Work Product is fully completed and finally approved, and all originals shall be either destroyed or returned to the Company, at the Company's option.

j) The State Parties may publicly identify the Company as a contributing broadband service provider, provided no information covered by this Agreement is revealed. No license for use, beyond that provided for herein, under any trademark, patent, copyright, trade secret or other intellectual property right is either granted or implied by disclosure of Confidential Information to the State Parties.

k) If and to the extent any provision of this Agreement is held invalid or unenforceable, all other provisions of this Agreement shall remain in full force and effect to the fullest extent permitted by law.

2

Figure 6: Standard NDA pg 2

l) This Agreement is binding upon and inures to the benefit of the Parties and their heirs, executors, legal and personal representatives, successors and assigns, as the case may be.

m) This Agreement is the entire agreement between the Parties hereunder and may not be modified or amended except by a written instrument signed by all Parties. Each Party has read this Agreement, understands it and agrees to be bound by its terms and conditions. There are no understandings or representations with respect to the subject matter hereof, express or implied, that are not stated herein. This Agreement may be executed in counterparts, and signatures exchanged by facsimile or other electronic means are effective for all purposes hereunder to the same extent as original signatures.

n) This Agreement shall be governed, construed, and enforced in accordance with the laws of the State of Missouri, without regard to its principles of conflict of law.

IN WITNESS WHEREOF, the Parties have read and agreed to this Nondisclosure Agreement as evidenced by the signatures of the Parties' authorized representatives below:

Company:

By: _____
(Authorized Signature)

Name: _____

Title: _____

GeoDecisions, a Division of Gannett Fleming, Inc.:

By: _____
(Authorized Signature)

Name: _____

Title: _____

State of Missouri, Office of Administration, Information Technology and Services Division:

By: _____
(Authorized Signature)

Name: _____

Title: _____

The Curators of the University of Missouri:

By: _____
(Authorized Signature)

Name: _____

Title: _____

CBG Communications, Inc.

By: _____
(Authorized Signature)

Name: _____

Title: _____

3

Figure 7: Standard NDA pg 3

Mississippi Broadband Mapping Project: Product Release White Paper

Contact Name Manager:	Gary Rawson
Contact Phone Number:	601-432-8113
Contact E-mail:	**Gary.Rawson@its.ms.gov**
Submitted By:	Kristin Rousseau
Contact E-mail:	**kristin.rousseau@broadmap.com**

Product Specification:	Spring 2013 NTIA Data Model
Product/Process:	NTIA—April 1, 2013 Data Deliverable
Dataset Submission QC:	NTIA—SBDD_CheckSubmission.py

Table of Contents

OVERVIEW

This white paper highlights the **Submission Summary** for this deliverable, as well as describes the **Data Gathering**, **Data Integration**, **Data Validation and Verification** and **Quality Control** processes used to create the Broadband Mapping Project's April 1st, 2013 data submission. To support varying levels of technical and program knowledge, both a **high-level summary** and a **detailed process review** are supplied.

SUBMISSION SUMMARY

PROVIDER DETAILS

PROVIDER PARTICIPATION

- Provider Participation Statistics Summary

Summary	Count
Total Providers Researched/Contacted (Includes Resellers)	222
Total Valid Broadband Providers	59
Non-Responsive Providers	0
Non-Cooperative Providers	1
Number of Providers – Represented in Data Submission	55
Number of Providers - Supplied Updates for this Submission	38
Number of Providers - Confirmed No Updates	10

- New Providers Since Last Data Submission
  - Magnolia Wireless, LLC
  - Media 3
  - Teletec Communications

- Existing Providers – Confirmed No Updates
  - Cable TV of Belzoni
  - Decatur Telephone Co. Inc.
  - DeltaCom, Inc.
  - Georgetown Telephone Company Inc.
  - Skycasters
  - Smithville Telephone Co. Inc.
  - Southern Light, L.L.C.
  - StarBand Communications Inc.
  - Telepak Networks, Inc.
  - ViaSat, Inc.

- Non-Responsive/Non-Cooperative Providers
  - New Edge Network, Inc. (EarthLink)

- Providers researched and identified as non-broadband providers can be viewed within the table at the end of this document.

COMMUNITY ANCHOR INSTITUTION (CAI) DETAILS

OVERALL STATISTICS

Community Anchor Institution - Categories	Overall Count	CAIID Counts	Broadband Subscriber (1 or 2)	Trans Tech	Advertised Speed Down	Advertised Speed Up
Category 1 - School K through 12	697	277	502	502	502	55
Category 2 - Library	278	234	197	197	197	37
Category 3 - Medical/Healthcare	437	0	243	243	243	136
Category 4 - Public Safety	869	0	136	136	136	93
Category 5 - Universities/Colleges	40	40	0	0	0	0
Category 6 - Other: Government	409	0	335	335	335	142
Category 7 - Other: Non-Government	0	0	0	0	0	0
Total	**2730**	**551**	**1413**	**1413**	**1413**	**463**

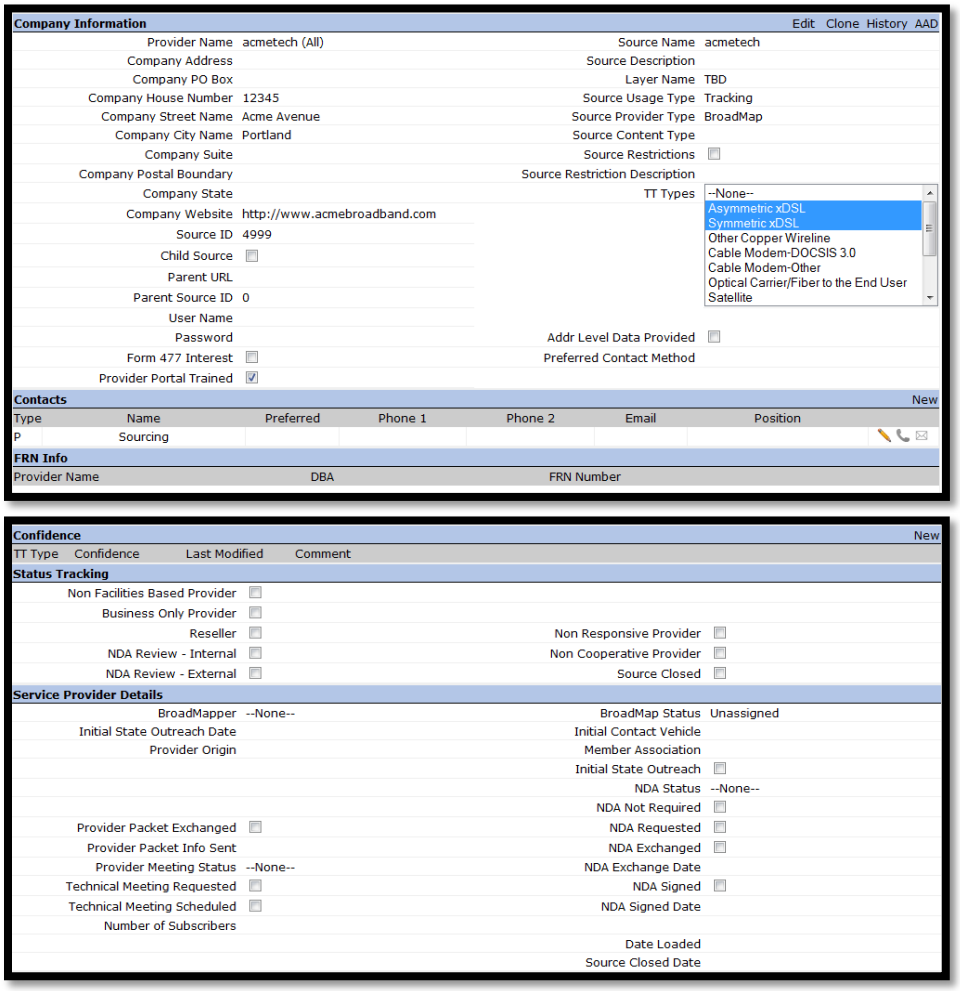
HIGH-LEVEL SUMMARY

DATA GATHERING

BROADBAND SERVICE AREAS, MIDDLE MILE AGGREGATION POINTS AND BROADBAND SERVICE OVERVIEW

The collection of Broadband Service Areas, Middle Mile Aggregation Points and Broadband Service Overview information is handled through the following Provider Outreach Process:

- Build and maintain an inventory of Broadband providers through currently known providers and research.
- The inventory and everyday interaction with providers is tracked using the Provider Catalog (PCat). Below are some examples of the web application, which has a shared access between our team and mapping partner (BroadMap).



Company Information — Edit Clone History AAD

Provider Name	acmetech (All)	Source Name	acmetech
Company Address		Source Description	
Company PO Box		Layer Name	TBD
Company House Number	12345	Source Usage Type	Tracking
Company Street Name	Acme Avenue	Source Provider Type	BroadMap
Company City Name	Portland	Source Content Type	
Company Suite		Source Restrictions	☐
Company Postal Boundary		Source Restriction Description	
Company State		TT Types	--None--
Company Website	http://www.acmebroadband.com		Asymmetric xDSL
Source ID	4999		Symmetric xDSL
Child Source	☐		Other Copper Wireline
Parent URL			Cable Modem-DOCSIS 3.0
Parent Source ID	0		Cable Modem-Other
User Name			Optical Carrier/Fiber to the End User
Password			Satellite
Form 477 Interest	☐	Addr Level Data Provided	☐
Provider Portal Trained	☑	Preferred Contact Method	

Contacts — New

Type	Name	Preferred	Phone 1	Phone 2	Email	Position
P	Sourcing					

FRN Info

Provider Name	DBA	FRN Number

Confidence — New

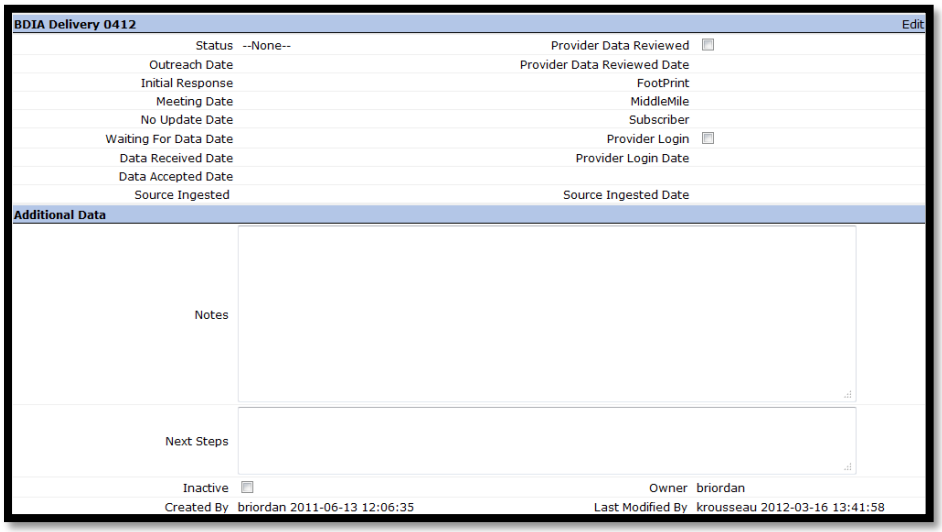
TT Type	Confidence	Last Modified	Comment

Status Tracking

Non Facilities Based Provider	☐		
Business Only Provider	☐		
Reseller	☐	Non Responsive Provider	☐
NDA Review - Internal	☐	Non Cooperative Provider	☐
NDA Review - External	☐	Source Closed	☐

Service Provider Details

BroadMapper	--None--	BroadMap Status	Unassigned
Initial State Outreach Date		Initial Contact Vehicle	
Provider Origin		Member Association	
		Initial State Outreach	☐
		NDA Status	--None--
		NDA Not Required	☐
Provider Packet Exchanged	☐	NDA Requested	☐
Provider Packet Info Sent		NDA Exchanged	☐
Provider Meeting Status	--None--	NDA Exchange Date	
Technical Meeting Requested	☐	NDA Signed	☐
Technical Meeting Scheduled	☐	NDA Signed Date	
Number of Subscribers			
		Date Loaded	
		Source Closed Date	



BDIA Delivery 0412 — Edit

Status	--None--	Provider Data Reviewed	☐
Outreach Date		Provider Data Reviewed Date	
Initial Response		FootPrint	
Meeting Date		MiddleMile	
No Update Date		Subscriber	
Waiting For Data Date		Provider Login	☐
Data Received Date		Provider Login Date	
Data Accepted Date			
Source Ingested		Source Ingested Date	

Additional Data

Notes			
Next Steps			
Inactive	☐	Owner	briordan
Created By	briordan 2011-06-13 12:06:35	Last Modified By	krousseau 2012-03-16 13:41:58

- Update provider material that describes the data requirements and logistics for data transfer.
- Update Non-Disclosure Agreement (NDA) for use in the project, where applicable.
- Maintain multiple protocols for the provider to submit data, including Secure File Transfer Protocol (SFTP) technology when desired.
- Conduct one-on-one informational discussions with each provider to communicate the following:
    - Requirements of this project;
    - Broadband data required to support the product data model;
    - Submission protocols available;
    - Capability to validate how the supplied data is aggregated.
- Download/receive provider data.
- Establish a repeatable process with provider. Maintain provider communication, transaction and data handling records throughout the project (dates contacted, data received, etc.).

COMMUNITY ANCHOR INSTITUTION (CAI)

The collection of CAI information is handled through the following CAI Collection Process:

- Collect and maintain inventory of CAIs through currently known CAIs, data mining, and research.
- Maintain web-based CAI portal for institutions to add or confirm attribution, location and enter broadband-specific information.
- Upload web-based data to Core Database for standardization.
- Perform internal cleansing, such as removing duplicate records, identifying gaps in broadband attribution and verifying category.
- Geocode CAI locations.
- Translate Core Database data to deliverable-ready format.
- Continue engagement with non-responsive institutions.

DATA INTEGRATION PROCESS

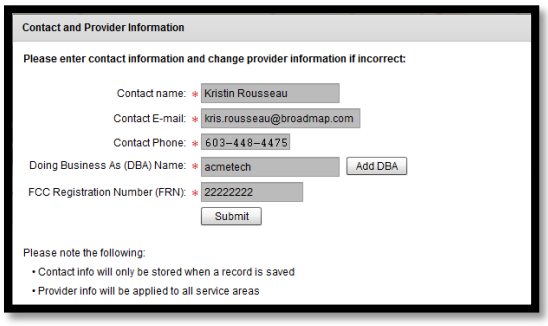
The data integration and processing mechanisms currently used allows for multiple types of inputs and result in a standardized output that meets the NTIA deliverable requirements. This flexible process supports data model changes and project-requested enhancements.

- Receive inputs from providers via submission protocols; upload into Sourcing Database and catalog with provider information.
- Review provider-supplied data for completeness and for potential discrepancies that require resolution prior to processing and flag as necessary.
- Categorize input into data-type category (addresses, block lists, paper maps, etc.).
- Standardize input based on data type within Staging Database.
- Create Compact Polygons (CP)—(internal methodology for generating area-based feature for coverage in Staging Database).
- Apply broadband attribution to CP; apply metadata to CP.
- Perform quality analysis of the CP against the source supplied to identify any completeness or accuracy issues.
- Request additional information from the provider if elements of coverage are missing or contain discrepancies. This is a second manual quality check to ensure data is complete.
    - Process coverage area to build the required NTIA data model layers.

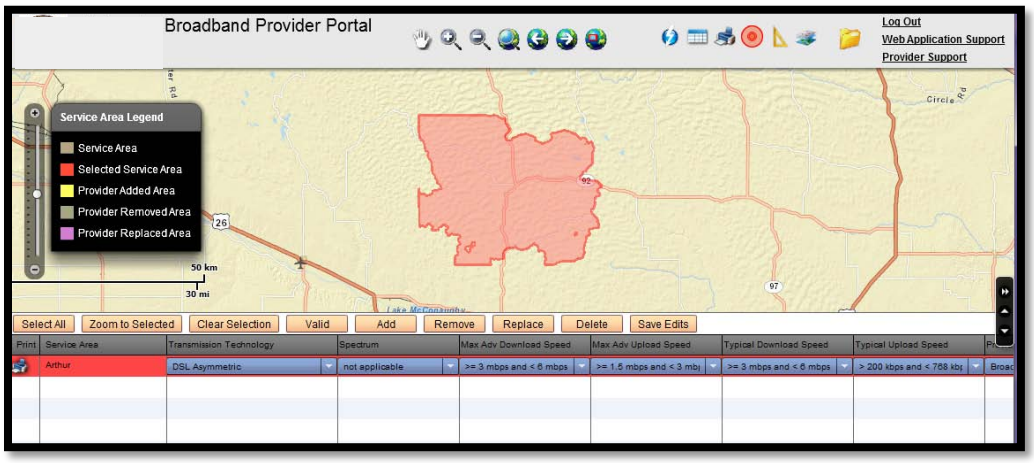
With the deployment of the Provider Portal this round, the data collection and later validation process was streamlined allowing both activities to occur within a secure web application. The majority of the providers used this methodology as it supplies them with more visibility into how their data is being represented and gives them knowledge and ownership of their coverage representation. Below are some bullet points and supporting screen shots on how the portal is used.

- Each provider is assigned credentials with a strong password to ensure security measures are taken into consideration

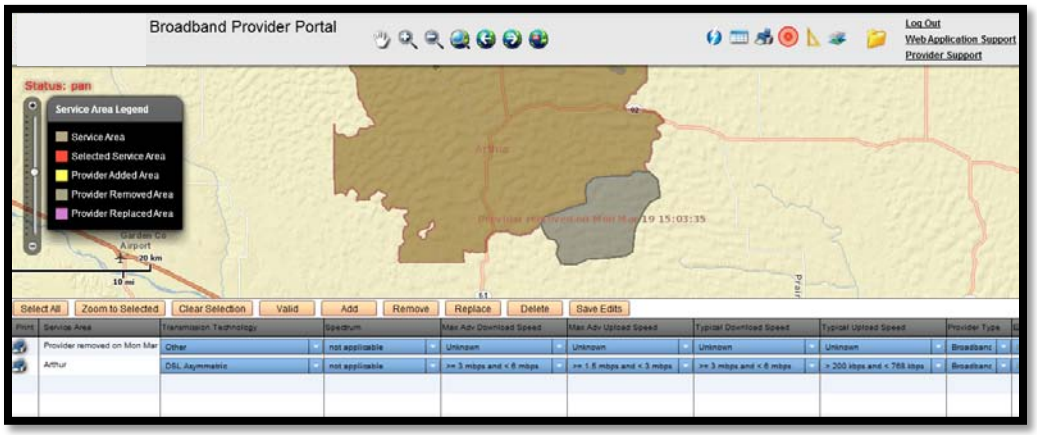
- Collection and confirmation our contact, as well as the company's DBA Name and FRN accuracy



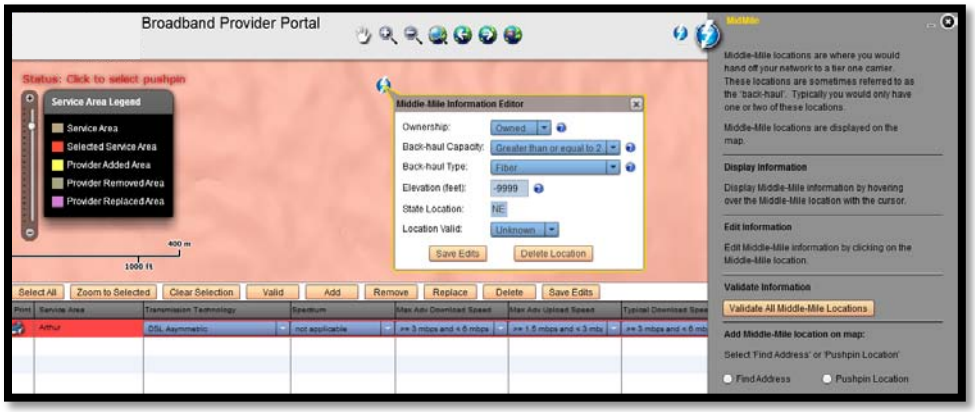
- Capability to review and request changes to the coverage footprint

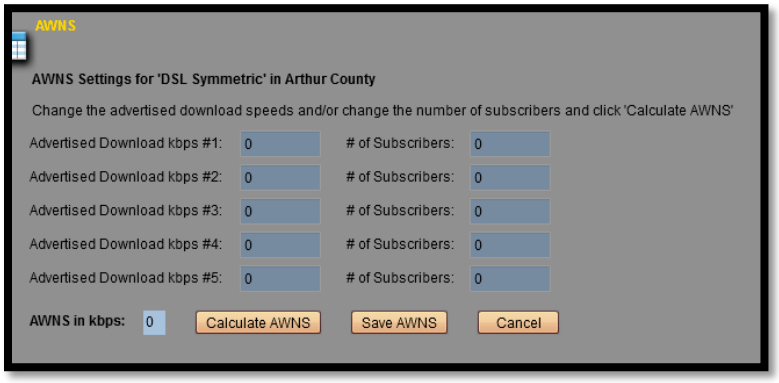


- The provider can Add/Remove portions, or all, of the footprint requesting that their footprint be increased or refined.

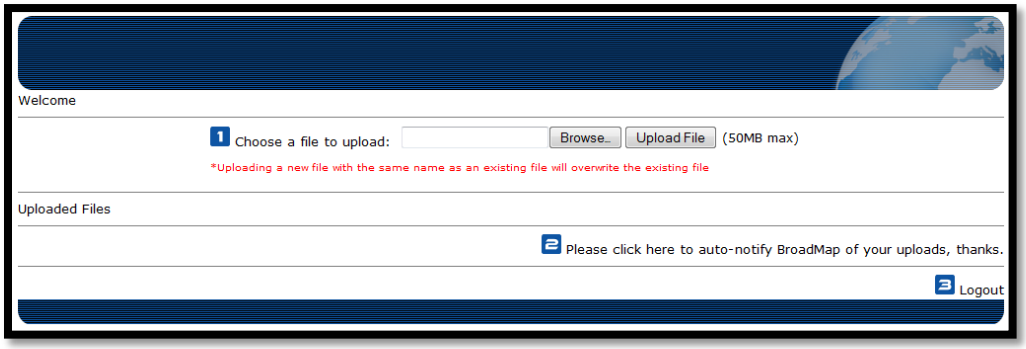


- Middle Mile and Average Weight Nominal Speed (AWNS) collection and validation





- File upload functionality to support providers that would prefer a shapefile, spreadsheet, PDF, KMZ/KML file be used to reflect changes for the data round



- Once the provider has review completed changes to their coverage, middle mile and AWNS, then can validate them all by signing off that everything is accurate.

DATA VALIDATION AND VERIFICATION

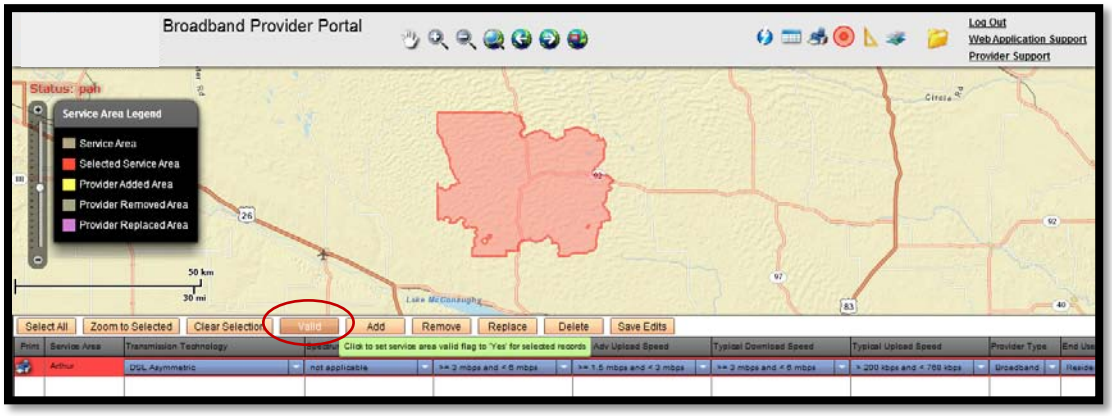
Following the creation of the product, process steps within Data Validation and Verification occur. To ensure the data collected and processed is as accurate and comprehensive as possible, provider validation and internal verification activities are employed. After the initial mapping of providers' coverage areas and serviceability claims, additional reviews are performed using the methods described in the subsections below in order of action (**Broadband Provider Validation**, **Third-Party Data Verification**, **Public Verification, and Confidence Values**).

BROADBAND PROVIDER VALIDATION—PROVIDER PORTAL APPLICATION

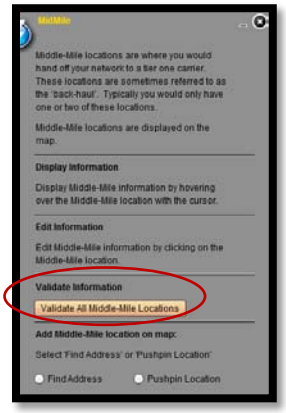
Providers are trained on and requested to use a secure interactive web application to review their current coverage area(s) and supporting broadband attribution and validate their data or submit change requests to update their data. All provider change requests go through the **Data Integration Process** and are reviewed with the provider to complete validation.

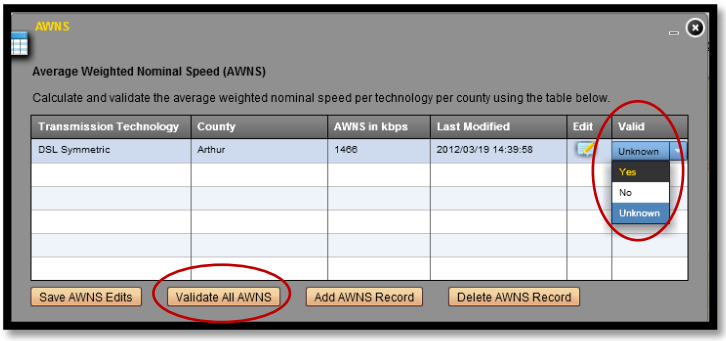
With the latest released of the Provider Portal, validation on the coverage area, middle mile and average could be completed individually. Validation examples are as follows:

- Coverage validation can be done on one record/footprint at a time or by selecting footprints and selecting the 'Valid' button. The provider could also print off or download their coverage for their own tracking purposes.



- Middle Mile & AWNS Validation





All validation results are tracked internally through our Validation Table, which also improves the overall **Confidence Value** as mentioned below.

THIRD-PARTY DATA VERIFICATION

The coverage is visually and programmatically compared against third-party data as new or updated coverage area information is received and ingested from providers. All anomalies identified during this analysis are reviewed with the providers.

3rd Party Source Name	Source Type	Verification Type
Pitney Bowes (PBBI)	Exchange Info Plus (Central Office Locations)	Exchange datasets are used to verify the following Transmission Technologies (TT): Asymmetric xDSL (10), Symmetric xDSL (20), Other Copper Wireline (30), and Optical Carrier/Fiber to the End User (50).
Media Prints	Cable Boundaries	Used to verify the following TT: Cable Modem—DOCSIS 3.0 (40) and Cable Modem—Other (41)
American Roamer	Wireless Coverage Patterns (EVDO, GPRS, WISP, HSPA)	Used to verify the following TT: Terrestrial Fixed Wireless—Unlicensed (70), Terrestrial Fixed Wireless—Licensed (71) and Terrestrial Mobile Wireless (80)
Comsearch	Wireless Spectrum Holdings and Tower Data	Used to verify the following TT: Terrestrial Fixed Wireless—Unlicensed (70), Terrestrial Fixed Wireless—Licensed (71) and Terrestrial Mobile Wireless (80)

SME PROVIDER COVERAGE VERIFICATION

Prior to each data submission, a review is completed between the broadband mapping team and broadband subject matter experts. Each coverage footprints is review in detail, including any changes from the previous data submission.

Any questions that arise during this review are brought back to the mapping team for resolution and then signoff. Providers are contacted if the item indented is in response to the initial information they supplied.

PUBLIC VERIFICATION – CROWD SOURCING

Since the last data submission, we have improved the public website - interactive map to collect more detailed feedback on the represented broadband coverage areas. This data had been reviewed with providers during the outreach phase and during one-on-one provider meetings.

The State website can be reviewed at the following hyperlink:

http://msbb.broadmap.com/StateMap/

CONFIDENCE VALUES

All verification, validation and manual quality review results are tracked by provider/technology type and stored and maintained within a **Validation table**. A confidence value is assigned, based on internal assessments of the collected information, to highlight the provider coverage areas and/or attributions that would benefit from further investigation and/or enhancements.

With the continued efforts on provider validation, 3rd party verification and the release of the public interactive map with feedback collection functionality, the confidence values will be utilized further to identify specific areas in need of attention. We're currently at the initial stages of this initiative, but will have a more complete picture in time for the next data submission.

QUALITY CONTROL

Following collection, processing and analysis of the provider and CAI data, the product is checked manually and algorithmically against the NTIA data model. Some of the items included within these checks are:

- Format correctness;
- Table and field structure;
- Valid values, including default values, where applicable;
- Geographic extent and topology errors.

Prior to data submission, another quality control script supplied by NTIA is run. This script, SBDD_CheckSubmission.py, creates an output in text form that is required to be submitted along with the final deliverable. All errors must come up clean, unless otherwise specified by NTIA.

DETAILED PROCESS REVIEW

To review the detailed process, please review the attached object:

BMap_ProcessDetails_2013_04_01.docx

PROVIDERS RESEARCHED

Below is a list of providers that were researched and contacted, but identified as non-broadband providers and didn't require inclusion within the data submission. Some may be due to different naming conventions or inaccurate FRN/DBA names and were therefore considered a closed source.

1-800-RECONEX, INC. -- TC-123-1525-01
5LINX Enterprises Inc. DBA Globalinx
8x8, Inc.
Access Point Inc.
Access Point, Inc. -- TC-123-1518-00
Accessline Communications Corporation
AccuTel of Texas, Inc. -- TC-123-1851-01
ACN Communication Services, Inc. -- TC-123-1793-00
ACN Digital Phone Service, LLC
Airespring, Inc.
Airespring, Inc. -- TC-123-2068-00
ALEC, Inc.
Alternative Phone, Inc.
Alternative Phone, Inc.
American Fiber Network, Inc. -- TC-123-2213-01
Apptix, Inc.
Aptela, Inc.
AT&T Communications of the South
Baldwin County Internet/DSSI Serv., LLC -- TC-123-2091-01
Bandwidth.com CLEC, LLC -- TC-123-2262-01
BANDWIDTH.COM, INC.
Bay Springs Communications, Inc. -- TC-123-2147-01
BellSouth Long Distance, Inc. -- TC-123-1530-00
Benchmark Communications, L.L.C. -- TC-123-2185-01
Benchmark Communications, LLC d/b/a Com One
Big River Telephone Company, LLC
Big River Telephone Company, LLC -- TC-123-1923-00
Birch Communications, Inc.
Birch Telecom of the South, Inc.
BLC Management LLC
BLC Management LLC -- TC-123-2110-00
Broadstar, LLC
Broadview Networks, Inc. -- TC-123-2263-00
Broadvox-CLEC, LLC -- TC-123-2299-00
BroadvoxGo!, LLC
Broadwing Communications, LLC
Broadwing Communications, LLC -- TC-123-2047-00
Budget Prepay, Inc. -- TC-123-1668-01
Budget PrePay, Inc. d/b/a Budget Phone
BullsEye Telecom, Inc.
Business Telecom Inc. -- TC-123-1152-00
Cable tv of Belzoni Inc.
Call Catchers Inc.
Callis Communications, Inc.
Callis Communications, Inc. -- TC-123-2227-01
Cause Based Commerce Incorporated
Cellco Partnership
Cellular South, Inc. -- TC-123-0900-04

iNetworks Group, Inc. -- TC-123-2297-01
Infinity Networks, Inc. -- TC-123-1984-01
InPhonex.com, LLC
Intellicall Operator Services Inc. -- TC-123-1143-00
Interface Security Systems, LLC
Intrado Communications, Inc.
IP Communications, LLC.
IP Networked Services, Inc.
Kentucky Data Link, Inc. -- TC-123-2123-01
Kosmaz Technologies LLC
Level 3 Communications, LLC -- TC-123-1655-00
LightSquared LP
Lightyear Network Solutions, LLC
M5 Networks, Inc.
Madison River Communications, LLC -- TC-123-1835-01
Matrix Telecom Inc. -- TC-123-1045-00
Matrix Telecom, Inc.
MCC Telephony of the South, LLC
MCImetro Access Transmission Serv., LLC
McLeodUSA Telecomm. Services, Inc. -- TC-123-1452-00
Mediacom Southeast LLC
Megagate Broadband, Inc. -- TC-123-1058-02
Metropolitan Telecommun. of MS, Inc. -- TC-123-2174-00
Metropolitan Telecommunications Holding Company
Micro-Comm, Inc. -- TC-123-2084-01
Midwestern Telecommunications, Inc
Millicorp
Mitel NetSolutions, Inc. -- TC-123-2020-00
Momentum Telecom, Inc
Momentum Telecom, Inc. -- TC-123-1927-01
Navigator Telecommunications LLC
Network Telephone Corporation -- TC-123-1609-00
Network USA, LLC
Neutral Tandem-Mississippi, LLC -- TC-123-2236-00
New Edge Network, Inc.
Nextg Networks of Illinois, Inc.
NextGen Communications, Inc.
Nexus Communication, Inc. dba TSI
Nexus Communications, Inc.
nexVortex,Inc.
Norlight, Inc. -- TC-123-2247-01
Norris Telecom, LLC -- TC-123-2056-01
NOS Communications Inc. -- TC-123-1316-00
NOS Communications, Inc.
Ojo Service LLC
OnWav, Inc
Phone.com, LLC
PNG Telecommunications, Inc. -- TC-123-1716-00




CenturyTel Acquisition LLC	Proximiti Technologies, Inc.
Centurytel Fiber Company, II, LLC -- TC-123-2155-01	Quality Telephone, Inc.
CenturyTel Solutions, LLC -- TC-123-1748-01	QuantumShift Communications, Inc.
Charter Fiberlink MS - CCVI, LLC	Qwest Communications Company, LLC
Cincinnati Bell Any Distance, Inc. -- TC-123-2094-00	Razorline LLC
Columbia Telecommunications, Inc.	RING CONNECTION, INC.
Comcast Phone of Mississippi, LLC -- TC-123-2196-01	Ring Connection, Inc. -- TC-123-1995-01
CommPartners, LLC	Ripley Video Cable, Inc.
Communication Lines, Inc.	RNK, Inc.
ConnectMe, L.L.C.	Rosebud Telephone, LLC
Contact Network, Inc. -- TC-123-1993-01	Select Connect Communications, LLC -- TC-123-1986-00
Covista, Inc. -- TC-123-1646-00	SinglePipe Communications
Credit Loans, Inc. -- TC-123-1742-01	Smartresort Co, LLC dba Beyond Communications
Crexendo Business Solutions, Inc. -- TC-123-2329-00	Southern Communications Services, Inc., d/b/a Southern LINC
Cypress Communications, Inc.	Southern Light, L.L.C. -- TC-123-2118-00
DAVCO, INC. -- TC-123-1449-01	Southern Telecommunications Co. LLC -- TC-123-1600-01
DeltaCom, Inc. -- TC-123-1076-00	Spectrotel, Inc. -- TC-123-2159-01
Dialog Telecommunications Inc.	Sprint Communications Company L.P.
Dialog Telecommunications, Inc. -- TC-123-2070-01	Stratos Offshore Services Company
Diamond Telephone Services, Inc.	Suddenlink
DIECA Communications, Inc. -- TC-123-1775-01	Suddenlink Communications
Dixie Net Communications, Inc. -- TC-123-1634-01	Talk America Inc.
Dixie-Net Fiber, Inc. -- TC-123-2026-01	TC Systems, Inc.
dPI Teleconnect, L.L.C.	TEC of Jackson, Inc. -- TC-123-0820-00
DSLnet Communications, LLC -- TC-123-1679-01	TecInfo Communications, LLC -- TC-123-2050-01
ECR Voice, LLC	TecInfo, Inc
EnTelegent Solutions, Inc.	TelCove Operations, LLC
Equinox, Inc.	Telepak Networks, Inc. -- TC-123-1741-01
Ernest Communications, Inc.	Telesphere Networks Ltd.
Etan Industries	TelLan Network Technologies, Inc. DBA: VoIPnet Technologies
EveryCall Communications, Inc.	Tennessee Telephone Service, LLC -- TC-123-2125-01
EveryCall Communications, Inc. -- TC-123-2131-01	Tennessee Telephone Service, LLC d/b/a Freedom Communications USA, LLC
Evolve IP, LLC	The Other Phone Company, Inc. -- TC-123-1612-01
Excel Home Phone, Inc.	Thinking Phone Networks, LLC
Express Phone Service, Inc.	Trans National Commun. Internat'l, Inc. -- TC-123-1750-00
Fast Phones, Inc.	Trans National Communications International, Inc.
Fionda VOIP, LLC	tw telecom of mississippi llc -- TC-123-1991-01
Florida Multi-Media Services, Inc	UCN, Inc. -- TC-123-2052-00
Four Star Marketing, LLC -- TC-123-2324-00	Universal Telecom, Inc.
France Telecom Corporate Solutions, LLC	US LEC of Tennesse Inc., d/b/a PAETEC Business Services
Frontier Communications of America, Inc. -- TC-123-1853-01	US LEC of Tennessee Inc. -- TC-123-1720-00
Global Capacity Direct, LLC -- TC-123-2188-01	Velocity Networks Inc
Global Capacity Group, Inc. -- TC-123-2259-01	Velocity The Greatest Phone Co. Ever Inc -- TC-123-2312-00
Global Connection Inc. of America	VoIPStreet, Inc.
GLOBAL CROSSING TELECOMMUNICATIONS, INC.	Vonage Holdings Corp.
Go-Tel, LLC	Wave2Wave Communications Inc.
GRANITE TELECOMMUNICATIONS LLC	WEHCO Video, Inc.
Granite Telecommunications, LLC -- TC-123-2000-01	Wholesale Carrier Services, Inc. -- TC-123-1992-00
GreatCall, Inc.	WiMacTel, Inc.
GulfPines Communications, LLC -- TC-123-1664-01	Windstream NuVox, Inc. -- TC-123-1606-00
Hypercube Telecom, LLC -- TC-123-1921-01	WirelessLand Technologies, Inc.
iCore Networks, Inc.	XFone USA, Inc. -- TC-123-2121-01
IDT America Corporation -- TC-123-1253-00	XO Communications, LLC
IDT Corporation	YMax Communications Corp. -- TC-123-2203-01
Image Access, Inc. -- TC-123-1638-01	Zayo Enterprise Networks, LLC
iNETWORKS GROUP, INC	

Montana Broadband Mapping
Methodology Report

Submitted To:

Chad Hultin
Montana Broadband Mapping Project Coordinator
State Information Technology Services Division

Submitted By:

Fred Gifford
Tetra Tech EC Inc.
and
Ken Wall
Geodata Services Inc.
March 22, 2013

Contents

Executive Summary

The following report describes methods and issues related to the April 1, 2013 deliverables to NTIA for Broadband Mapping in Montana. This data submission is compliant with all guidance and specifications provided by NTIA. As per NTIA guidance we are using the current versions of the Broadband data model and the validation script.

Montana has developed a robust operational data model, components of which are described in this report, to support our broadband mapping efforts. We feel our operational model can support any reasonable modifications to NTIA requirements. Since this deliverable format is derived from our operational data model, we anticipate some modifications will be required. We are able to take best practices recommendations from the NTIA and incorporate those into the final deliverable without major modifications of our work flow and operating rules.

Our mapping process started with infrastructure points (central offices, remote terminals, wireless towers and antenna locations, middle mile and backhaul), cable franchise areas, and anchor institution addresses. Those served an important role, especially with providers who have not actively participated in coverage mapping and those supplying broadband coverage for large generalized areas and larger geographic census units such as census tracts. When providers have not supplied detailed information of their service areas that can be mapped at the census block level, coverage models were derived dynamically from this infrastructure based on geoprocessing techniques specific to each broadband technology. Examples of geoprocessing techniques include using infrastructure points in conjunction with the road network to predict the area served for DSL coverage. For all providers of wired broadband services, those have all been completed and remain static unless a provider chooses to participate with more detailed coverage mapping at a level of geography at or smaller than a census block.

The State of Montana Broadband Program has developed a web-based application for creating and maintaining broadband availability data. The Broadband Editing Tool is designed so that that non-technical staff can easily update both spatial and attribute data through using a simple -to -use web interface.

We also developed a system to quantify “validated” data for the purpose of determining what was suitable for delivery to NTIA. The operational data model maintained reliability and validity codes. As more data is obtained from providers in maintenance updates, the validity and reliability of infrastructure points has diminished, though they remain the only basis we have for non-participating broadband providers.

Provider Summary

Through extensive research we identified a master list of 160 potential providers in Montana with 54 companies identified as actual broadband providers. The Montana Broadband map includes 48 broadband providers. The full list of the potential providers researched but subsequently identified as not providing broadband service is included in Appendix A.

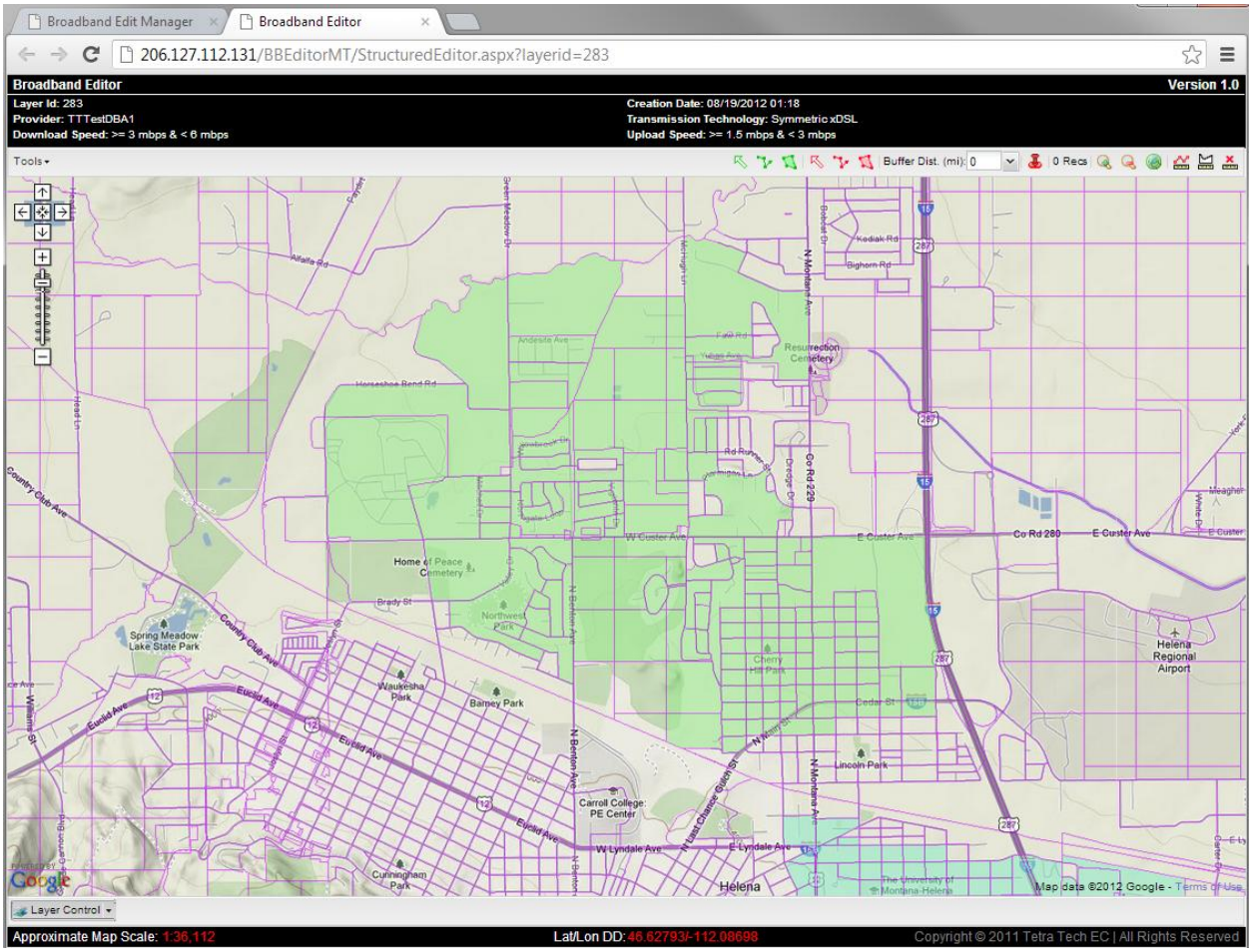
State Specific Issues

The most notable issue specific to Montana is the lack of non-disclosure agreements (NDAs) with the providers. To date no provider has agreed to sign an NDA in Montana due to open records laws in the State. However, the vast majority of broadband providers in the State have elected to cooperate with the project and have provided at least some information about their coverage areas. Where providers have not provided data, or not provided adequate data we have used a variety of methods including modeling, field mapping, and use of public sources to develop map data.

Web Based Editing Application

The State of Montana Broadband Program has developed a web-based application for creating and maintaining broadband availability data. The Broadband Editing Tool is designed so that that non-technical staff can easily update both spatial and attribute data through using a simple -to -use web interface (Figure 1). The tool's feature set gives editors fine-grained control over how broadband service areas are represented.

Figure 1. Broadband editing web map interface.



A significant advantage of using an application like the Broadband Editor is that all data updates are completed using structured data entry tools. This means data integrity is enforced during data entry and illegal attribute values cannot be input by the editor.

Editing Tool Components

The editing tool has five main components. A **Structured Editor** for wired broadband service edits, an **Unstructured Editor** for wireless service, a **Point Editor** for Middle-mile and Community Anchor Institution Edits, a **Management Console** for user and data administration, and an **Export Toolbox** for creating NTIA formatted data.

Structured Data Editor – The structured data editor allows coding of wired (land based) broadband service by census block (census blocks are used due to NTIA mapping requirements). For census blocks that are less than .25 square miles in size the editor is able to select the census block and indicate the type of service provided. For census blocks that are greater than .25 square miles the editor is able to select 500 square meter polygons that are nested within the census block where service is available. This gives users a more accurate depiction of broadband availability on the

state broadband map and supports creation of the courser NTIA census block and street segment geography. The results are processed as census blocks and street segments for the national standardized submittal to NTIA.

Unstructured Data Submittal – For wireless coverage areas, which are not based on preexisting geographic features, users submit zipped GIS shapefile polygon layers through the web interface to indicate where service is available. The shapefile is converted into a geodatabase feature class and the user assigns the appropriate service attribute values.

Point Editor – The point editor allows users to add, delete, move, and edit attributes for the middle-mile and community anchor institution feature classes. The point editor uses a simple interface and enforces data integrity validation for all edits.

Management Console – The management console allows for full administration and management of data in the system. The management console is designed around three user roles. Each role has a different level of permissions and capabilities. The roles include:

State Administrator – Full access to all system components, user administration, and editing capabilities.

Provider Administrator – Access to providers' data layers for edit, review and submittal to the State for inclusion in the State Broadband Map.

Provider Editor – Access to providers' data layers for edit.

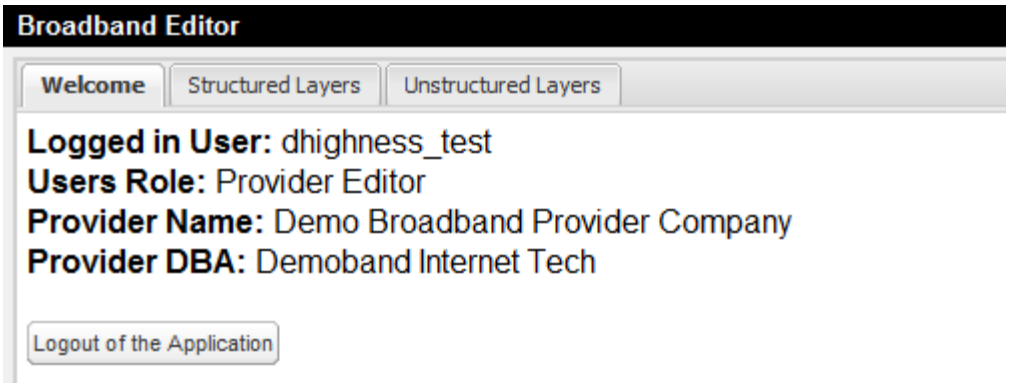
The management console entry screen (Figure 2) shown below includes three tabs –

Welcome Tab – Notes about the project, application revisions and links to help documents.

Structured Layers – Editing and administration tools for broadband coverage based on census blocks.

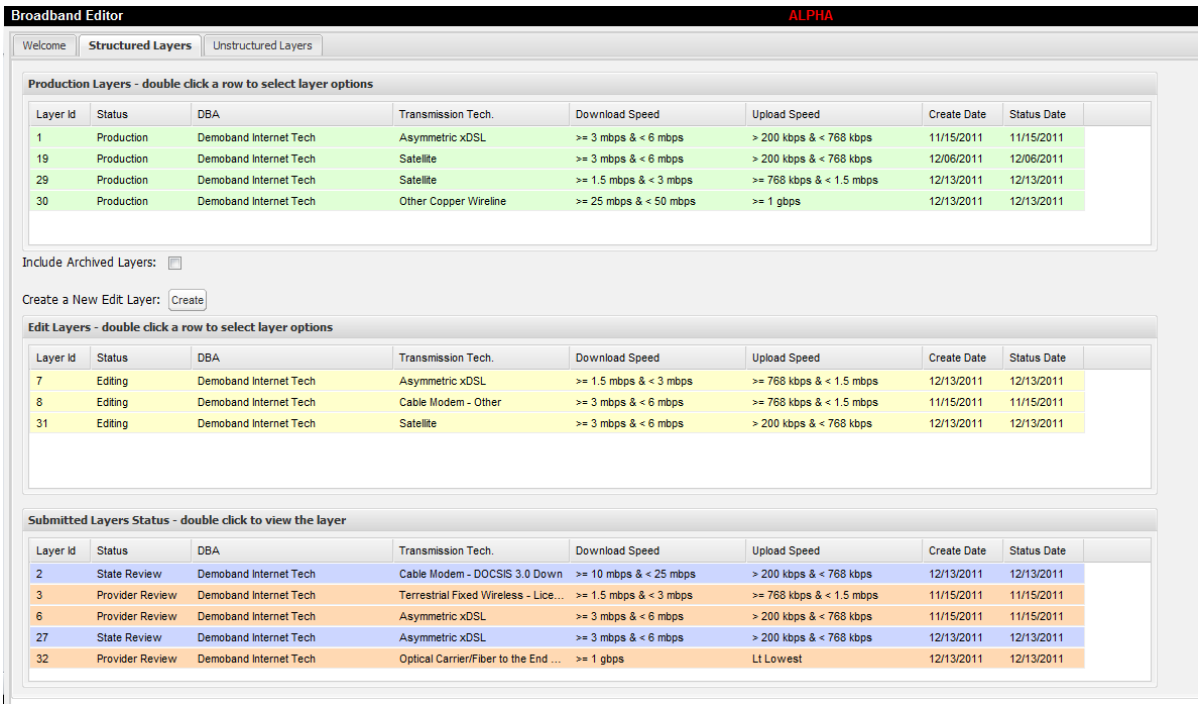
Unstructured Layers – Loading and administration tools for broadband coverage based on GIS shapefiles.

Figure 2. Management Console Entry Screen.



The structured and unstructured management tabs (Figure 3) allow for data management.

Figure 3. Structured and unstructured management tabs.



The data management tabs provides access to all edit and reviewing functionality for all data layers. The full list of layers in the system is only viewable by system administrators. Provider editors and administrators will only see and be able to access their specific data.

There are three lists of layers viewable to the user –

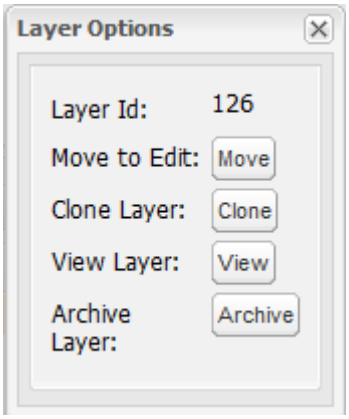
Production Layers – List of the current approved layers for the provider that are currently being reported to NTIA and shown on the State's broadband web map application.

Edit Layers – List of layers currently being edited by the provider.

Submitted Layers – List of layers that are in review by the Provider Administrator or the State Administrator.

Double clicking a row layer in a layer list brings up a context specific menu of options.

Figure 4. Production Layer List Options.



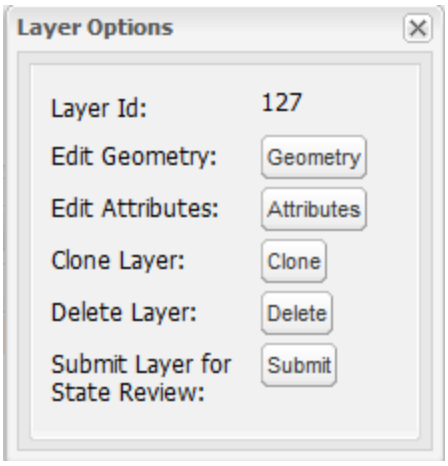
Move to Edit makes the layer available for editing.

Clone Layer makes a copy of the existing layer that can be edited.

View Layer launches the map viewer for a layer.

Archive Layer creates archive of layer and takes it out of production. (State Admin Only)

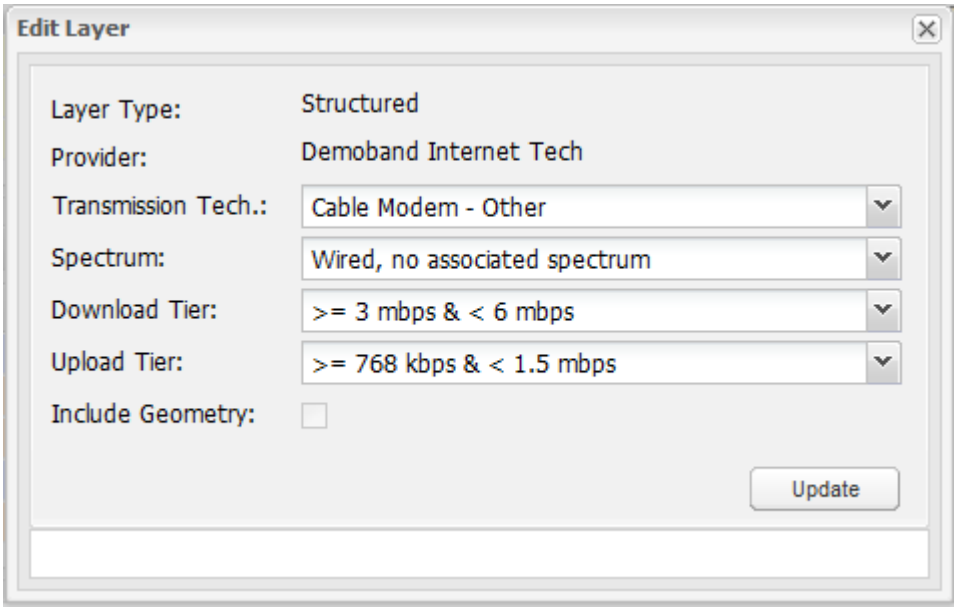
Figure 5. Edit layer list options.



Edit Geometry launches the map editing tool (discussed in next section).

Edit Attributes brings up an editor to allow changes to a layers properties including transmission technology, spectrum and others as shown below –

Figure 6. Edit Attributes Options.



Transmission Tech, Spectrum, Download Tier, Upload Tier are attributes specific to each broadband layer and adhere to NTIA data submittal standard.

Clone Layer makes a copy of the existing layer that can be edited.

Delete Layer completely deletes the current edit version of the layer.

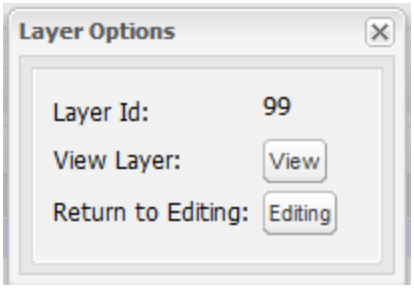
Submit Layer for State Review moves a layer to the Provider Admin list for review. (Provider Admin and State Admin only)

Submitted layer list options –

View Layer launces the map viewer for a layer.

Return to Editing moves a layer to the edit queue so that it may be edited.

Figure 7. Return to Editing screen.



Export Toolbox – The export toolbox is implemented as a set of geoprocessing tools that run within the ArcGIS desktop client. The toolbox includes a collection of tools that convert data created using the editor into the format required for NTIA. In addition the toolbox includes a variety of automated data integrity checks. The purpose for this separation of the editing tools from the data format and conversion tools is to support minor changes to the NTIA data model without having to make changes to the editing application – just the geoprocessing tools.

Data Sources

In the first rounds of broadband mapping, provider presence maps were developed for central office locations and incumbent local exchange carrier locations for all assumed providers in the state. These were identified through a commercial spatial database purchased from GeoTel Inc., and supplemented by other public data sources such as the State's Public Service Commission and DSLReports.com. These were intended to be "talking maps" and general intelligence on where providers have infrastructure for subsequent phone and written communications with providers. These maps were compared to counties served by provider in the state's telecommunications association directory.

Web site research, review of materials submitted to the state by providers, and public websites, such as the FCC were researched for each provider.

New providers are contacted to request data when a significant number of speed tests are recorded, or when we learn of their presence through ancillary sources. Providers that contact us directly and submit data are also included.

Broadband Coverage

Data submitted by broadband providers was accepted as is and was mapped in complete form when provided as a broadband coverage at the same scale or larger scale than the census block level. Provider coverage submitted at a coarser geographic scale (e.g., census tracts, counties, zipcodes) was supplemented with public data, independent measurements and GIS modeling techniques. When provider submitted data appeared to be exaggerated or providers did not participate in the broadband mapping process, independent measurements and other data sources (e.g., state GIS framework structure locations, speed tests, survey results, website data and infrastructure) were used to override or supplement the provider data.

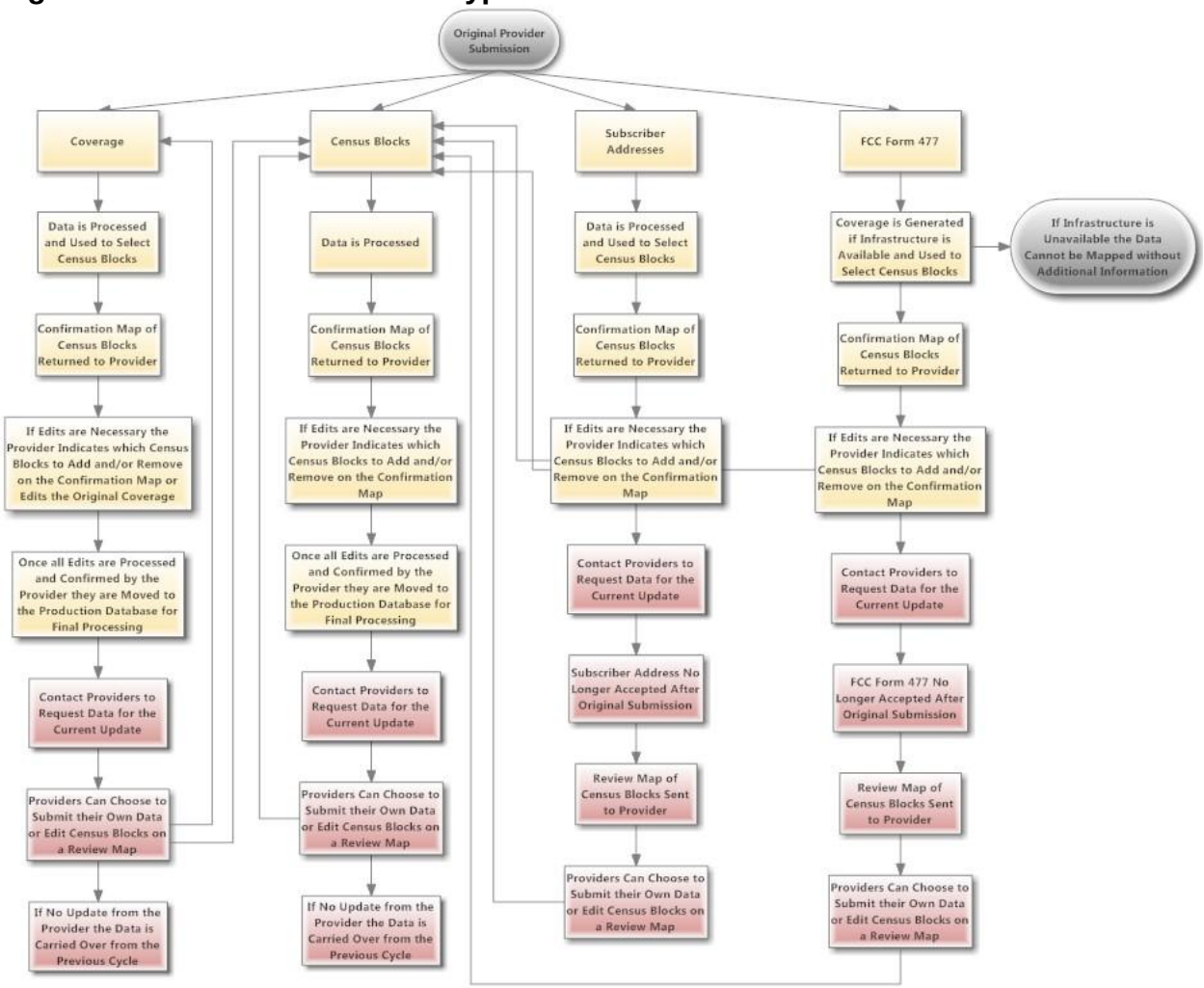
Broadband providers that chose to submit data did so in a wide variety of formats, levels of completeness, and at varying geographic scales including: the web-based application, narrative descriptions, analog and digital coverage maps, CAD files, GIS shapefiles and geodatabases, KMZ and KML files, FCC 477 reports, and data spreadsheets. All data formats were processed using the web-based application.

If data was submitted by a provider in a format that did not allow mapping at the census block level of geography, providers were sent standardized maps that included census

blocks and a data spreadsheet in an attempt to standardize the inputs and increase the geographic granularity of the provider data submission.

Although each provider had individual characteristics and nuances in their data submissions, several data patterns can be described generalizing the provider submissions.

Figure 8 Provider Submission Types and Workflow



Providers Submitting FCC Form 477 Reports or Similar Format

Broadband providers are required to submit FCC Form 477 reports twice a year to the FCC; recently 477 submissions have been done using a structured web site maintained by the FCC. The 477 reports require broadband providers to submit a list of census tracts with the number of subscribers based on maximum advertised downstream and upstream speed tiers. Several providers submitted their actual FCC 477 report or a modified version in analog or digital format.

Figure 9 FCC Form 477 Example

Upload	>200<768	>200<768	>200<768	>3m<6m	
Download	>768<1.5m	>1.5m<3m	>3m<6m	>6m<10m	
Census Tract					Total
MT-[redacted]	60	-	-	-	60
MT-	60	3	-	1	64
MT-	27	1	-	-	28
MT-	311	9	2	-	322
MT-	120	2	-	-	122
	578	15	2	1	596

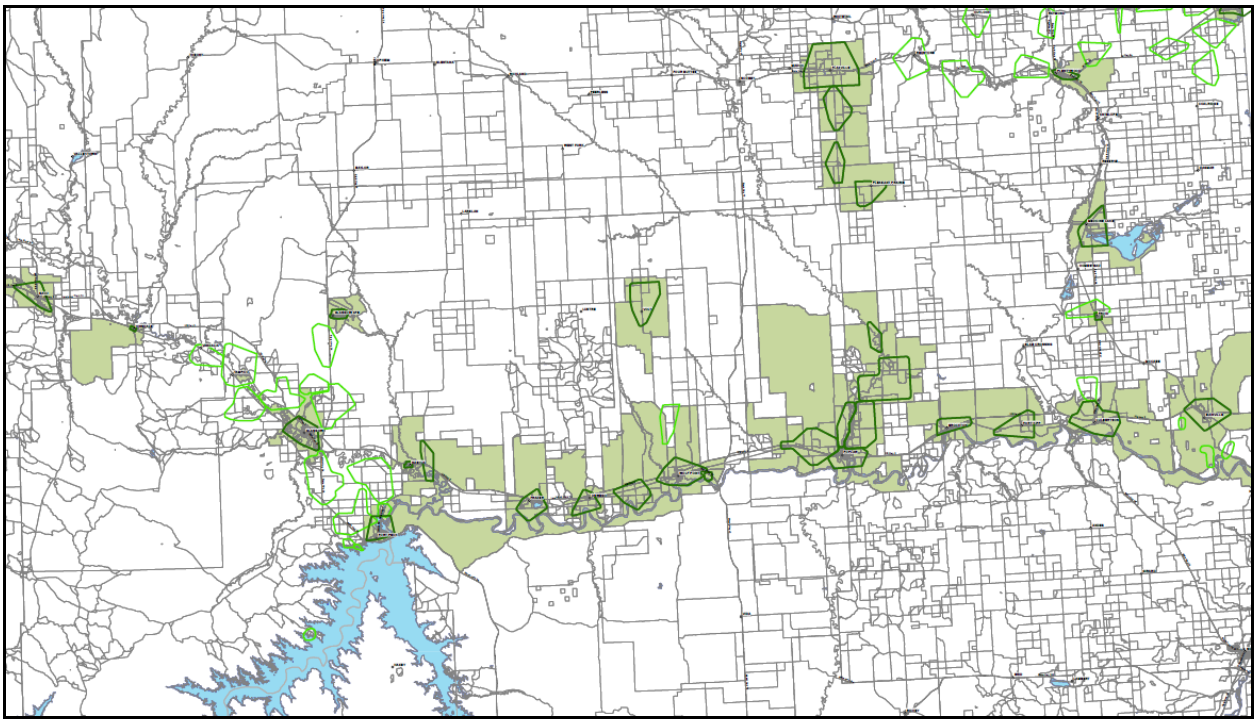
How They Were Handled

FCC Form 477 reports were entered into a standardized format that included the census tract ID code, maximum advertised downstream and upstream speed tier code, and number of subscribers (when available). Since the FCC 477 reports requires providers to submit data for all speed tiers within a census tract, only the highest maximum advertised speed for any given census tract was entered into the standardized spreadsheet in order to be compliant with the definition of broadband service.

The spreadsheets were then joined to a census tract feature class template that included the attribute fields from the NTIA schema. The resulting feature class was a geographical representation of the FCC 477 report including the technology of transmission and speed information. This feature class was used in conjunction with validated infrastructure data (i.e., central offices and/or remote terminals) to run the DSL or Cable geoprocessing models respectively.

The resulting census block selection from the DSL or Cable model was displayed on a standardized review map and returned to the provider for confirmation.

Figure 10 Review Map Example



If additional edits were required the provider “marked-up” the review map(s) to indicate which census blocks should be added and/or removed. The provider submission was handled as a census block update (describe in the section below) from that point forward. In future updates from those providers FCC Form 477 data was not accepted and providers who originally submitted data in this format were asked to make edits to the review maps.

Figure 11 Provider's "Marked-Up" Map Example

Several providers did not respond to the original confirmation maps and their final submission represented the best modeled estimate of their coverage at the census block level for DSL and/or Cable technologies. Providers that submitted FCC 477 data for fiber to the end user or fixed wireless could not be mapped and were not included in the final broadband map unless they provided additional data at the census block level or equivalent coverage at a similar scale.

Providers Submitting Census Block Coverage

Census blocks submitted by providers representing their broadband coverage area come in a wide range of formats including: analog and digital maps, CAD files, GIS shapefiles and geodatabases, tabular lists, and spreadsheets.

Figure 12 Census Block Submission Example (names blacked out)

STATE	PROVIDER	DBA_NAME	FRN	CENSUS_BLO	TECHNOLOGY
MT	[redacted]	[redacted]	0018626853	300470002001003	10
MT			0018626853	300470002001008	10
MT			0018626853	300470002001072	10
MT			0018626853	300470002001079	10
MT			0018626853	300470002001083	10
MT			0018626853	300470002001092	10
MT			0018626853	300470002002012	10
MT			0018626853	300470002002021	10
MT			0018626853	300470002002023	10
MT			0018626853	300470002002027	10
MT			0018626853	300470002002029	10
MT			0018626853	300479403011013	10
MT			0018626853	300479403011018	10
MT			0018626853	300479403011022	10
MT			0018626853	300479403011048	10
MT			0018626853	300479403011051	10
MT			0018626853	300479403011055	10
MT			0018626853	300479403011056	10
MT			0018626853	300479403011057	10
MT			0018626853	300479403011058	10
MT			0018626853	300290013011000	10
MT			0018626853	300290013011005	10
MT			0018626853	300290013011010	10
MT			0018626853	300290013011011	10

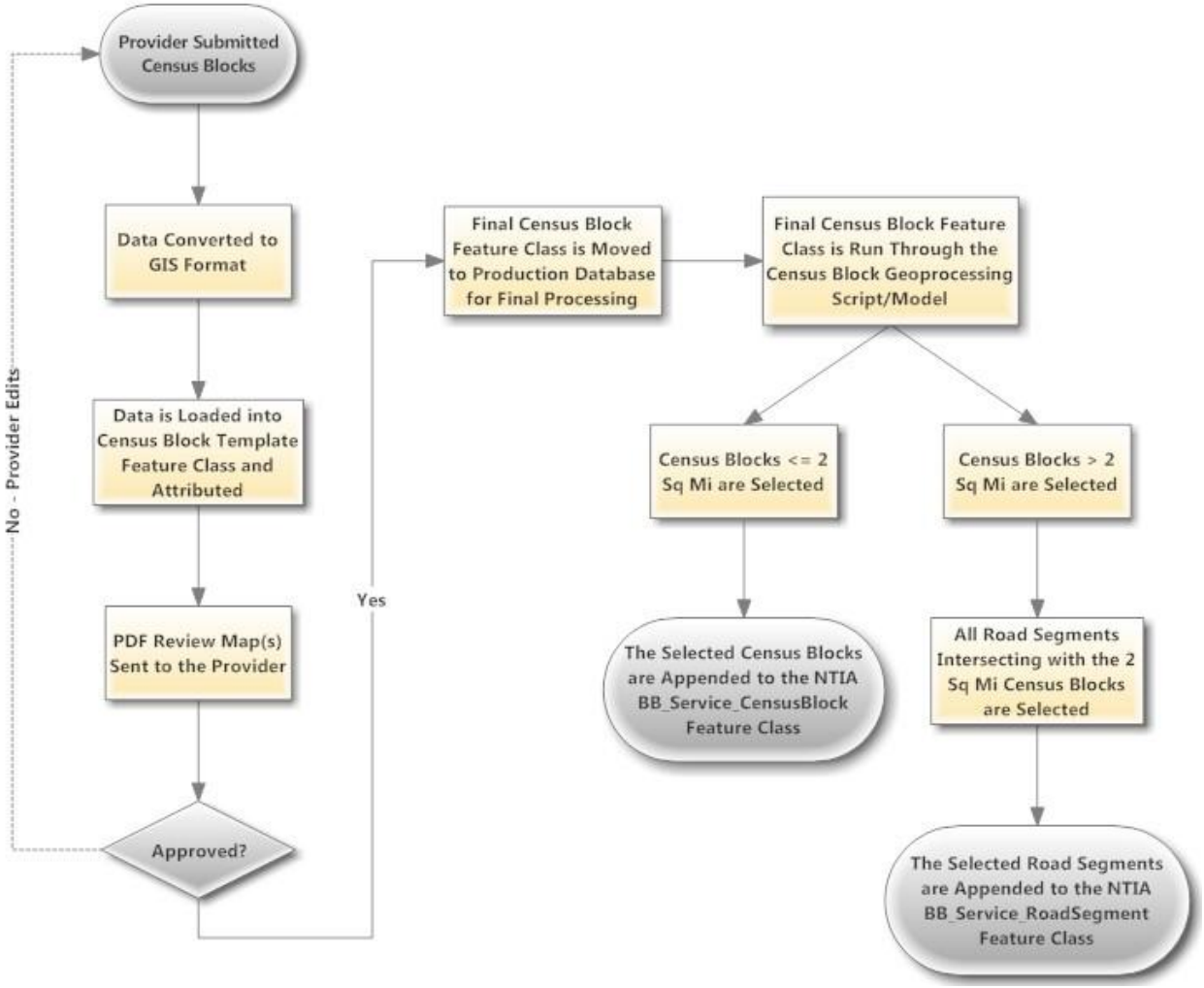
How They Were Handled

All census block submittals were loaded into a census block feature class template that included all of the attribute fields from the current NTIA schema. Census 2010 geography was used as required by NTIA. Domain codes were entered in the appropriate attribute field for technology of transmission, maximum advertised downstream speed, and maximum advertised upstream speed. If a provider did not

identify the technology of transmission for a given census block or blocks, they were contacted by phone or email in order to obtain this information. In instances where speed information was not included in the data submission providers were contacted and asked to supply this data; in cases where the provider refused to supply either the downstream, upstream, or both speeds, and their advertised speeds were not available on their web site, the lowest domain code was entered in the applicable attribute field.

Standardized confirmation maps were created for each provider by type of technology and sent to the provider for review. Once processing was completed for a provider's census block submission, the census block feature class was run through an Esri geoprocessing model that performed several quality control-quality assurance tests and selected census blocks less than or equal to two square miles and road segments that intersected census blocks greater than two square miles and were appended to the appropriate NTIA transfer data model feature classes.

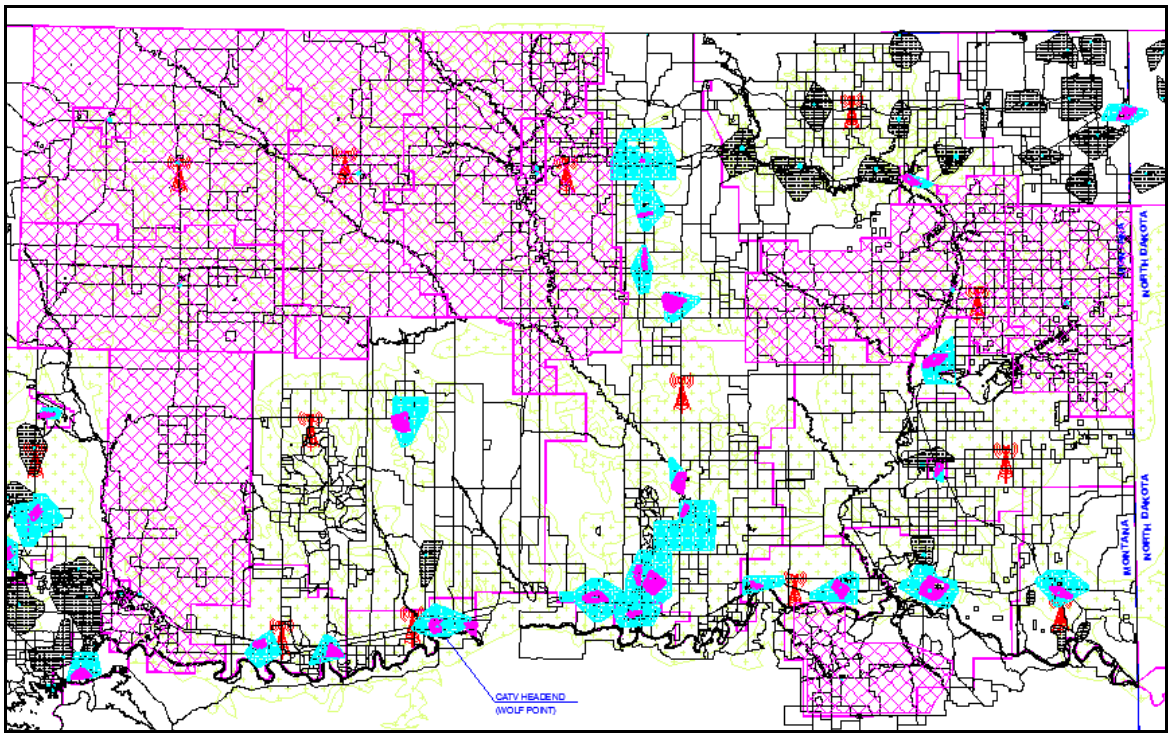
Figure 13 Census Block Geoprocessing Model


Provider Submitted Census Blocks
Data Converted to GIS Format
Data is Loaded into Census Block Template Feature Class and Attributed
PDF Review Map(s) Sent to the Provider
Approved?
No - Provider Edits
Yes
Final Census Block Feature Class is Moved to Production Database for Final Processing
Final Census Block Feature Class is Run Through the Census Block Geoprocessing Script/Model
Census Blocks <= 2 Sq Mi are Selected
Census Blocks > 2 Sq Mi are Selected
The Selected Census Blocks are Appended to the NTIA BB_Service_CensusBlock Feature Class
All Road Segments Intersecting with the 2 Sq Mi Census Blocks are Selected
The Selected Road Segments are Appended to the NTIA BB_Service_RoadSegment Feature Class

Providers Submitting Coverage Data

Provider submitted coverage data were differentiated from the other types of geographic data submissions coarser than a census block since they represented the full and explicit range of broadband coverage. Similar to the other types of data submissions, coverage data was also provided in a wide range for formats including: analog and digital maps, CAD files, GIS shapefiles and geodatabases. Coverage data was submitted by several providers or was available on several providers' websites.

Figure 14 Coverage Data Example



How They Were Handled

All coverage data was loaded into a coverage template feature class schema that included all of the attribute fields from the NTIA schema. The method of data loading was driven by the format in which it was received. Providers who supplied GIS shapefiles or feature classes could generally be loaded into the coverage template feature class schema using the simple data loader while CAD data had to be exported to GIS format prior to being loaded into the coverage template.

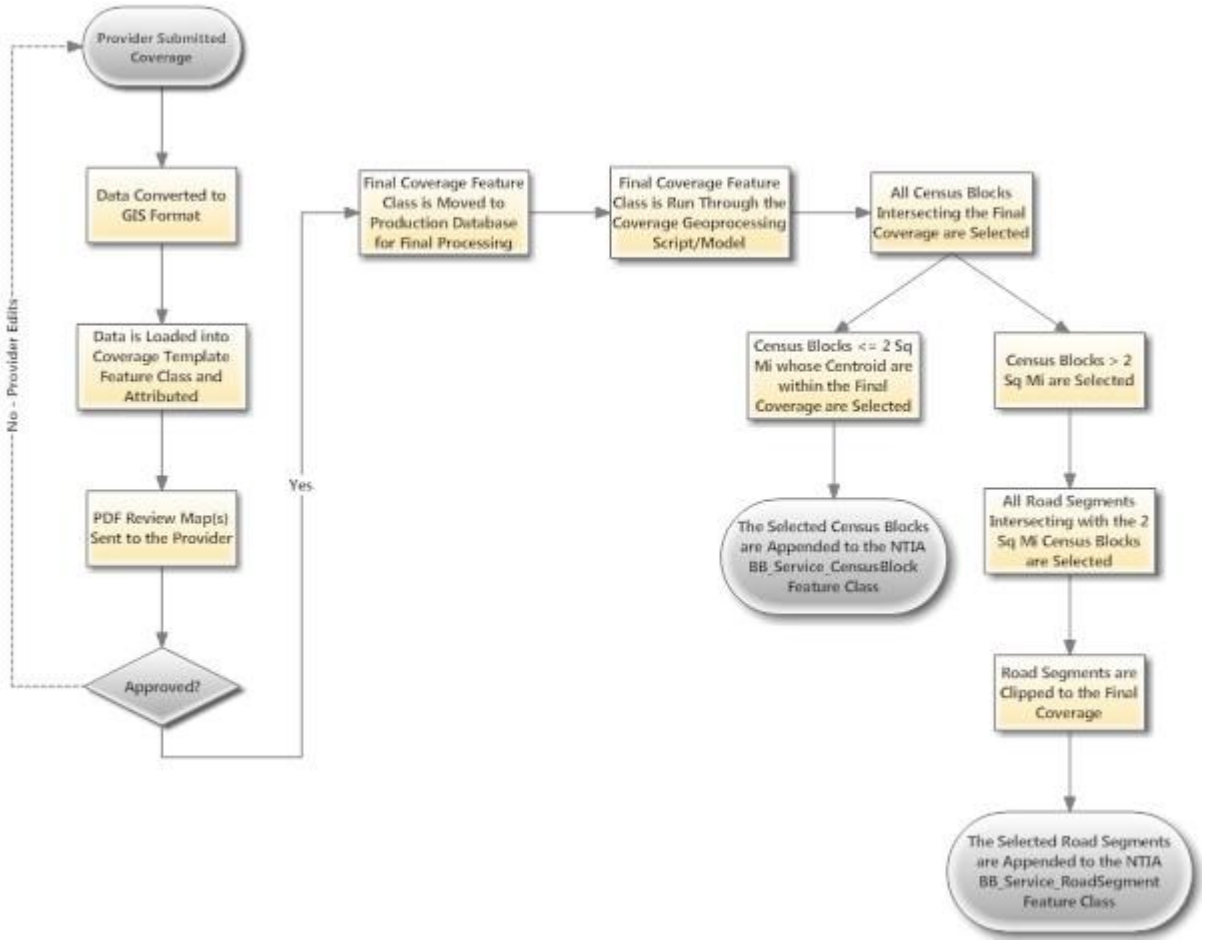
Coverage data supplied as digital or analog maps required georectification and digitizing prior to loading into the coverage template feature class. Domain codes were

entered in the appropriate attribute field for technology of transmission, maximum advertised downstream speed, maximum advertised upstream speed, and spectrum. If a provider did not identify the technology of transmission for a given coverage area, they were contacted by phone or email in order to obtain this information.

When speed information was not included in the data submission, providers were contacted and asked to supply this data; in cases where the provider refused to supply either the downstream, upstream, or both speeds, the lowest domain code was entered in the applicable attribute field. If a provider did not specify the type and spectrum used for fixed wireless the default values for unlicensed were used.

Standardized confirmation maps were created for each provider by type of technology and sent to the provider for review. Once processing was completed for a provider's coverage submission, the data was run through an Esri geoprocessing model that performed several quality control-quality assurance tests and selected census blocks less than or equal to two square miles when the centroid of the census block was within the coverage area. Road segments that intersected with census blocks greater than two square miles were selected and then clipped to the coverage area in order to provide the most accurate representation based on the provided coverage. The selected census blocks and road segments were appended to the appropriate feature class in the NTIA data transfer model.

Figure 15 Coverage Geoprocessing Model

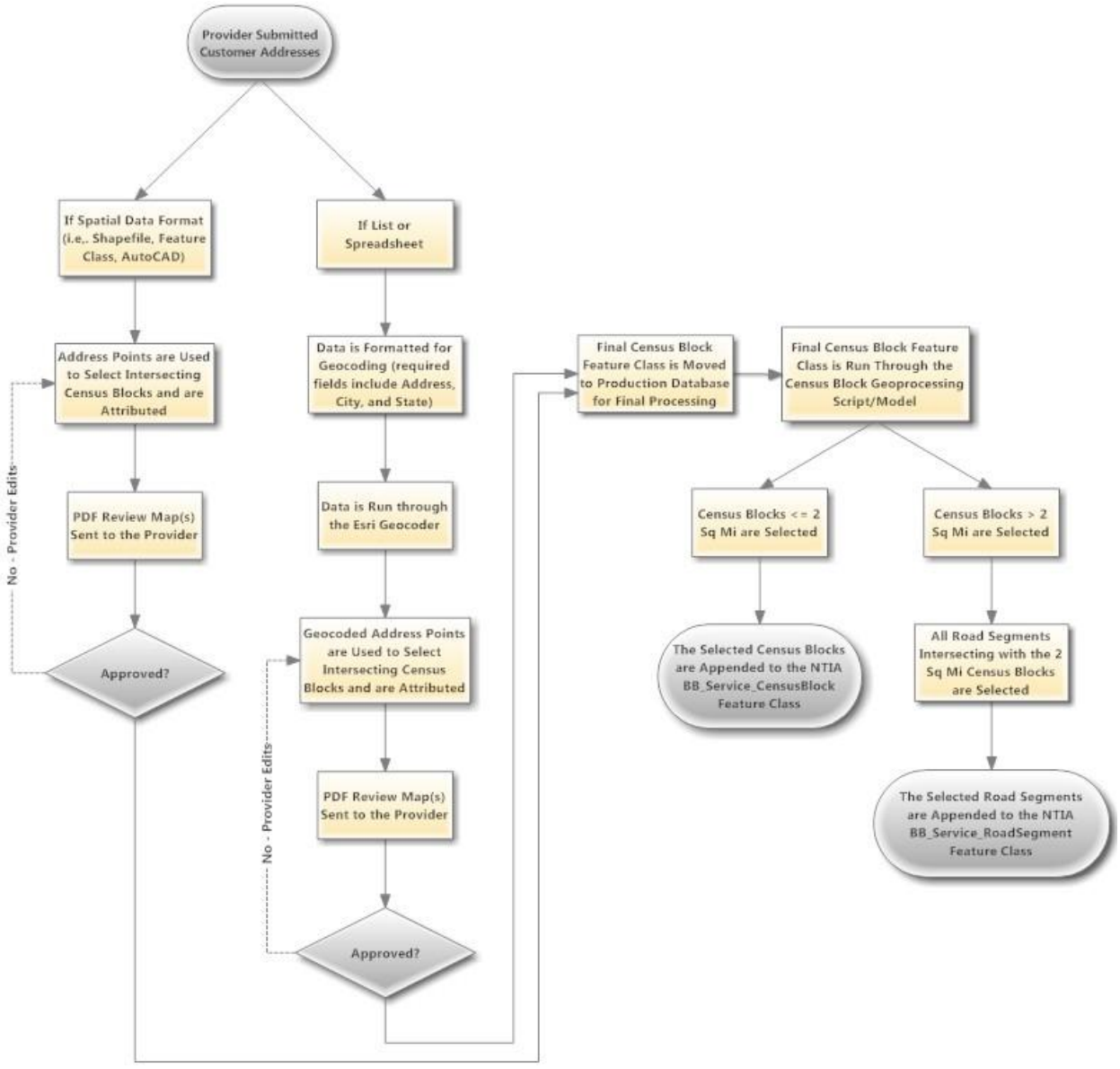


Providers Submitting Customer Locations

Providers that submitted customer locations typically fell into one of four categories. Several providers submitted customer locations in AutoCAD files, the points were exported to a shapefile and used to select all intersecting census blocks. Other providers submitted analog or digital maps that included customer locations, these images were georectified and census blocks were selected by an operator viewing the customer point images underlying the census blocks. Lists of customer addresses were also submitted. The data was loaded into a spreadsheet and geocoded using ESRI Business Analyst USA Geocoding engine. The geocoded points were treated identically to customer locations submitted in GIS or CAD format and used to select intersecting census blocks.

The resulting census blocks were added to confirmation maps and returned to the provider. If edits were necessary the provider indicated on the map which census blocks needed to be added and/or removed. The provider submission was handled as a census block update (described in the section above) moving forward. In subsequent updates subscriber address data was discouraged and providers who originally submitted data in this format were asked to make edits to the review maps.

Figure 16 Customer Addresses Geoprocessing Model



Providers Submitting Other Levels of Coarse Geographic Submission

This category had a wide range of submissions. The most common were telephone exchange areas or equivalent, wire centers, zip codes, counties or general references to towns or cities. These coarse geographic submissions were problematic because these areas were typically very large and lacked the detail of a defined coverage area resulting in over-exaggerated broadband coverage.

How They Were Handled

Operational rules established early in the project heavily scrutinized provider data that appeared to significantly over-represent broadband coverage and often resulted in a rejection of the submitted data. Providers who submitted coarse geographic levels of coverage data and infrastructure for DSL or cable modem service were initially that also were represented in the last point of aggregation infrastructure point file were sent estimated census block coverage maps and spreadsheets, and provided a second submission with finer level geography.

Providers submitting town locations for DSL or Cable were handled differently, and used as validation for central offices from the last point of aggregation table, and subsequently to run the DSL modeling routine or validate a cable or cable plus areas.

Cable Modem Geoprocessing Model

An ESRI geoprocessing model was created to generate coverage areas for Cable providers who did not submit census block or coverage data (i.e., census tract providers).

The most authoritative GIS layer available from the state with incorporated areas and city boundaries was used as a surrogate to model cable broadband coverage. Some towns that were not incorporated were also added. Municipalities and towns were sporadic in their digital update of these maps, since annexations and other boundary modifications were ongoing and difficult to maintain in real time updates. To compensate, likely areas contiguous to these city boundaries were added, labeled "Cable-Plus" in the operational data model. These additional polygons were determined using operator interpretation, road density, structures points from Info USA in Esri Business Analyst, speed test results, and in some instances NAIP imagery. In general areas were added that were immediately contiguous to existing city or town boundaries that represented likely areas where cable service existed. We were conservative in this approach and did not include populated areas near the cable plus boundaries unless they were directly contiguous to existing boundary areas.

Cable broadband providers primarily work under the structure of franchise agreements with municipalities. In the early rounds of broadband mapping updates, phone calls were made to the largest cities in the state in order to obtain that respective city's cable franchise agreement. They were all either unknown or a text agreement without maps.

The full set of potential cable areas were then passed through validation sources to determine if cable was provided. This included public sources, such as the Warren Communications Cable Fact book (http://www.warren-news.com/factbook.htm).

The second and most authoritative form of validation was data received from cable providers at the census tract, block, or coverage level of geography. A spatial join geoprocessing operation was performed on these datasets with the full set of potential cable coverage areas in order to further validate areas with cable coverage.

The third source of validation came from the public speed test site maintained throughout the project. Whenever user submitted speed tests identified cable modem broadband service near or adjacent to existing estimated cable areas, the cable-plus boundaries were expanded using the same method of digitizing outlined above.

It was not possible to differentiate between technology of transmission codes 40 and 41 using this indirect mapping method. The only authoritative way to determine this information was from data submitted by a provider. In all cases where the provider did not indicate the type of cable modem technology being used, the code for Cable Modem-Other (41) was assumed.

DSL Geoprocessing Model

An ESRI geoprocessing model was created to generate coverage areas for DSL providers who did not submit census block or coverage data (i.e., census tract providers). This model is based on typical DSL technology which can provide service up to 18,000 feet from a central office or remote terminal, unless otherwise specified by a provider.

Since DSL lines are typically buried alongside roadways, underneath roadbeds, or strung on aerial telephone lines which tend to run alongside a road, a GIS dataset of a state's road network were used as a surrogate to model DSL areas. In the initial rounds of broadband maintenance we purchased commercial (GeoTel) and publicly available data sources representing last points of aggregation (LPA) for DSL, including central offices and remote terminals. Each LPA was validated based on publicly available data, provider data, and independent measurements. LPAs were used in a DSL model only if they were supplied directly from a provider or could be verified by two or more sources. The actual geoprocessing model used the validated central office and remote terminal locations to generate a raster cost surface based on all of the available roads radiating

out 18,000 feet from each active LPA point. The raster coverage was converted to a polygon feature class and a small back-buffer was applied to achieve the final DSL coverage polygon representing a provider's maximum possible DSL coverage area. The DSL coverage areas were then used to select intersecting census blocks and road segments.

Remote terminals were provided or publicly available for only a small number of providers, therefore this method may tend to underestimate the full DSL coverage for a provider.

It was not possible to differentiate between ADSL or SDSL based on the LPA data; the only authoritative way to determine this was from data submitted by a provider. In all cases where the provider did not indicate which type of DSL service was being provided, the technology code was assigned to 10 "Asymmetric xDSL".

2000 To 2010 Census Block Conversion

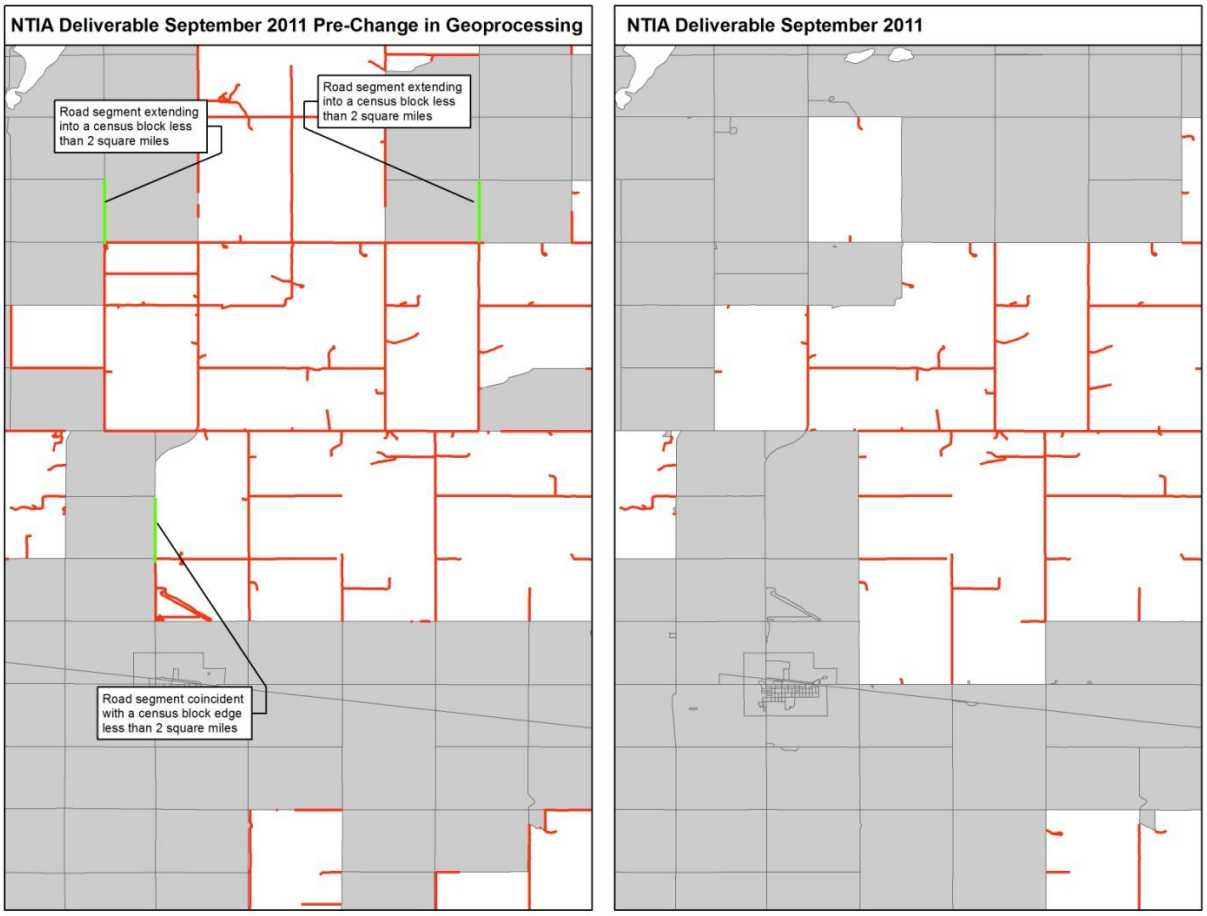
The September 2011 deliverable to NTIA required the transition from 2000 census data to 2010 census data, but the conversion process was dependent upon the type of data submitted by a provider. These providers fell into two categories, block providers or coverage providers. The conversion to 2010 census geography was a straightforward process for the coverage providers; the reference to the census block data in the geoprocessing model used to select census blocks and road segments was simply changed from the 2000 data to the 2010 data and each provider's data was re-run. The conversion from 2000 census to 2010 census data for block providers required several geoprocessing steps due to the inability to simply match census block IDs across vintages. The census blocks for each provider were dissolved by type of technology to form a quasi-coverage area. The dissolved blocks were then used to select any 2010 census block whose centroid fell within the "coverage area."

Road Segment Geoprocessing Change

Prior to the September 2011 NTIA data submission, road segment in census blocks greater than 2 square miles were selected with a straight intersect. This resulted in road segments being selected that were coincident with census block edges in blocks less than or equal to 2 square miles. Using this same geoprocessing methodology combined with the new 2010 census blocks and TIGER roads, road segments were selected that were coincident with census block edges and that extended into census block less than or equal to 2 square mile. We believe this "error" occurred due to the improvements in the spatial accuracy of both the 2010 census blocks and road segments for 2010 where features were now coincident. For the September 2011 submittal a small negative buffer

(-0.5 feet) was applied to the intersect to avoid selecting roads that were coincident with census block edges and/or those that extended into census blocks less than 2 square miles. This resulted in a significant decrease in the number of road segments reported but overall we believe this method more accurately portrays each provider's coverage area.

Figure 17 Road Segment Geoprocessing Change Example



Wireless Coverage

Three forms of wireless coverage were provided in this table, fixed point to point wireless, mobile wireless and satellite. No public data was located on fixed wireless infrastructure points, except notification of availability on provider's web pages, and in some instances, specific towns, recreation or commercial locations where wireless service was provided. Most coverage came directly from providers or was mapped from locations provided on a provider web page and was processed using the web-based application. Some providers requested that we run a propagation model for their fixed wireless coverage. A few providers submitted coverage that appeared to be derived from propagation modeling. We also ran a propagation model for one non-responsive mobile wireless provider.

Most of the public data research focused on mobile wireless providers using cellular service spectrums. The Federal Communications Commission (FCC) Universal Licensing System (ULS) is the consolidated database and application filing system for most Wireless Radio Services. ULS supports electronic filing and provides public access to licensing information, weekly Public Notices, FCC rulemakings, processing utilities, a telecommunications glossary, and much more." The FCC ULS Advanced Licensing Search was queried for all FCC licenses filed in the state; a relational database was built from the results. Information from the database was extracted in order to perform the cellular tower propagation modeling for wireless broadband.

The FCC ASR and ULS reporting systems were the source for most of the tower locations. Towers were required to be licensed when they meet specific published criteria. These included some variables that could be modeled with GIS statewide, such as varying proximity to airports and heliports, combined with specific local level criteria not easily obtained or modeled statewide such as the grade construction within proximity of these, and any structure over 200 ft in height. A number of cell towers providing broadband were likely not located in the FCC database.

Providers submitted coverage data in a wide variety of formats, levels of completeness, and at varying geographic scales. All types of data was accommodated and processed whenever possible. An open structure process for submittals was allowed, accepting any data, and attempting to work with the provider when questions arose. If data was submitted by a provider in a format that did not allow a direct coverage to be mapped, such as a coarse level of geography such as a census tract, or county, feedback was provided to the providers in the form of standardized spreadsheets in an attempt to standardize the inputs, and increase the geographic granularity of the provider data submission. Although each provider had individual characteristics and nuances in their data submissions, some data patterns can be described generalizing the typical types of submissions. In general, for fixed wireless to be mapped it was necessary to receive data from a provider, since there were no public sources available on point to point wireless tower locations in public form, except as depicted on providers web pages in a few instances.

Providers Submitting FCC Form 477 Report or Similar Format

Geographically, these were lists of census tracts of coverage, accompanied by additional documentation on technology of transmission, speed tiers, and number of customers. Providers submit these twice a year to the FCC and recent submissions have been done using a structured web site maintained by the FCC. A few providers submitted printouts that appeared to be from this web format and were typically complete and standardized. More providers submitted spreadsheets roughly in the F477 format, but with modified and generalized data.

How They Were Processed

If the providers identified specific coverage areas as census blocks, or direct coverage area, or as infrastructure tower locations, they were processed and mapped. Providers identifying census blocks were processed by dissolving the census blocks into single coverage polygons by speed tier. Providers identifying a direct coverage area were converted directly to GIS polygon files and attributed. Providers submitting tower locations were mapped as circular polygons centered on the tower with a radius averaging 10 miles measured as Euclidian (straight line) distance from the tower. Providers that specified variable radius were mapped as circles at the radius they submitted.

Providers Submitting Census Block Coverage

Some providers submitted coverage as census blocks, either through a tabular listing of census blocks or spreadsheet, or in map format. It was common that a provider where public data indicated multiple technologies of transmission only submitted some of the technologies of transmission.

How They Were Processed

These were loaded directly into the master Census 2000 block coverage by provider and attributed with available data submitted by the provider. In instances where some data attributes were missing, such as advertised or typical speed tiers, or subscriber data, the data attributes were left blank or null. Providers identifying census blocks were processed by dissolving the census blocks into single coverage polygons by speed tier. A visual inspection of independent speed test data overlaying the provider submitted block coverage was completed, but no action was taken to override a provider's submittal.

Providers Submitting Actual Coverage Maps

Coverage maps were submitted by several providers, or coverages were derived from public sources or from other indirect indicators of coverage such as customer point maps or tabular lists in text or spreadsheet format. These were differentiated from the other types of geographic submission coarser than a census block since they represented the full and explicit range of coverage.

How They Were Processed

Coverage maps were treated as explicit coverage and all census blocks intersecting any portion of a coverage were selected and attributed with the provider coverage by technology of transmission, and all related attributes were transferred to the census block representation. The method of creating the coverage varied by source. Providers who supplied broadband coverage as a GIS polygon or CAD feature were converted to polygons. Some providers, including non-responsive providers who did not submit

anything to the project, had published coverage maps of various forms on their web sites or submitted an image in jpg, tiff, pdf or other graphic format. These were geogeorectified to base map layers, typically roads, but sometimes other features such as state or county boundaries or towns, and subsequently converted to polygon features. Then they were intersected and transferred to census block feature classes like the digital GIS submissions. Providers who submitted customer locations typically fell into four categories. Some were submitted as AutoCAD files where the points could be transferred to the GIS, then spatially joined to the census blocks they were located within. Others submitted maps in image format that were georectified in the same manner as other images, then census blocks were selected by an operator viewing the customer point images underlying the census blocks. When customer lists were submitted, they were loaded in a database and geocoded using ESRI Business Analyst USA Geocoding engine based on TeleAtlas road features. The geocoded points were subsequently treated identically to customer locations submitted in GIS or CAD format, and spatially joined to the census block template file. A visual inspection of independent speed test data overlaying the provider submitted block coverage was completed, but no action was taken to override a provider's submittal.

Providers Submitting Other Levels of Coarse Geographic Submission

This category had a wide range of submissions. The most common was as telephone exchange areas or equivalent, wire centers, zip codes, counties or general references to towns or cities. The problem with these submissions was that often a given polygon overlapped a census block or multiple blocks, and in most cases, they were much larger geographic entities than a census block.

How They Were Processed

Our operating rules established early in the project did not allow final provider coverage to significantly over represent provider coverage. Those providers that submitted coverage area by coarse geographic features and did not specifically identify coverage as a coverage layer or census blocks were not able to be processed. No interpolated data was used to calculate these data, if the data was not provided by a provider in a format capable of processing; the data was not calculated for that provider.

Providers Submitting Antenna Tower Information

Some fixed wireless providers submitted antenna and tower information.

How They Were Processed

The providers requested that we run propagation models using Radio Mobile.

National Providers Not Submitting Mobile Wireless Coverage

AT&T Mobility LLC (AT&T) has not provided any data for the Montana Broadband Mapping Project. In a phone call on August 15, 2011 Mr. Wagner said that the AT&T legal team would not allow their broadband coverage data to be provided to Montana since they would not agree to the non disclosure agreement required by Montana state law.

How They Were Processed

Since 2010, we have been collecting information from the AT&T Towers web site, the FCC Universal Licensing System, the FCC Antenna Structure Registration, and other independent sources. We have systematically verified tower locations when possible using aerial imagery. In 2012, we drove 24,925 miles of state and federal highways throughout Montana collecting additional data on signal strength and data download and upload speeds. In previous national broadband map submissions we have used a georectified image of AT&T's on-line coverage map. For the Spring 2013 submission, we felt we had enough independently verified cell tower locations to build a propagation model based on finer resolution digital elevation models.

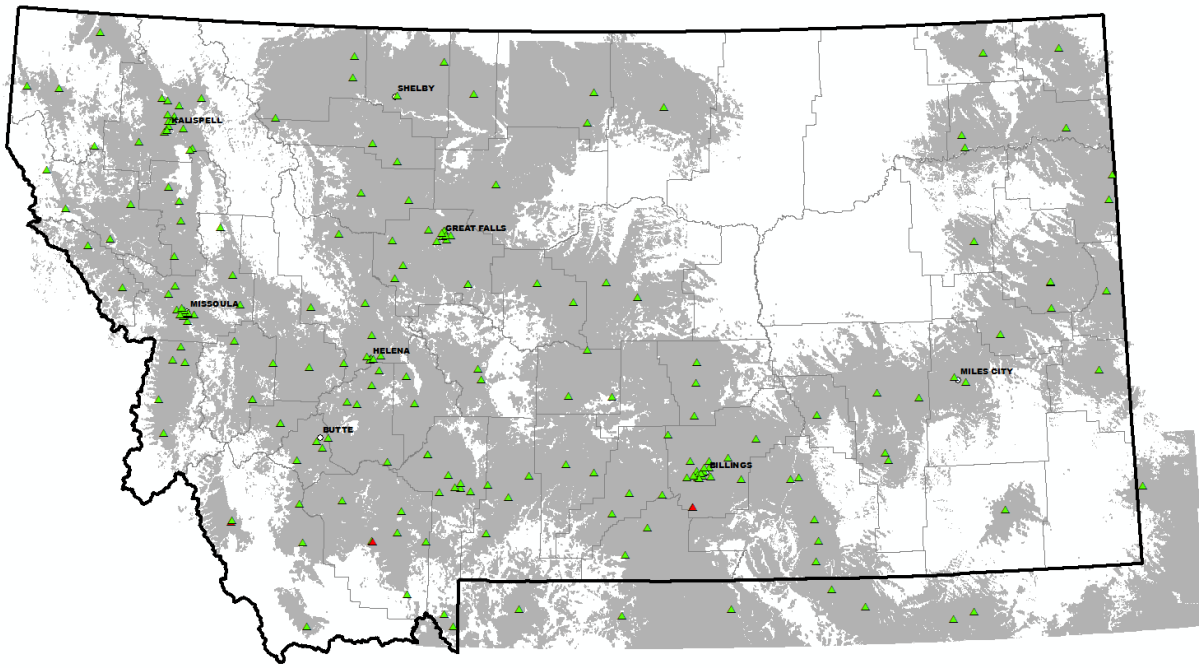


Figure 18 - AT&T Suspected Cell Tower Locations

Upon finalizing suspected AT&T tower locations, Thiessen polygons were created using the Esri Create Thiessen Polygons tool. This generated a polygon area for each tower where any point within the given polygon was closest to that tower than any other. Next the Thiessen polygons were intersected with the AT&T coverage area polygon. This allowed us to establish a maximum distance (or range) for each tower, a required parameter for the Radio Mobile software we used for propagation modeling.

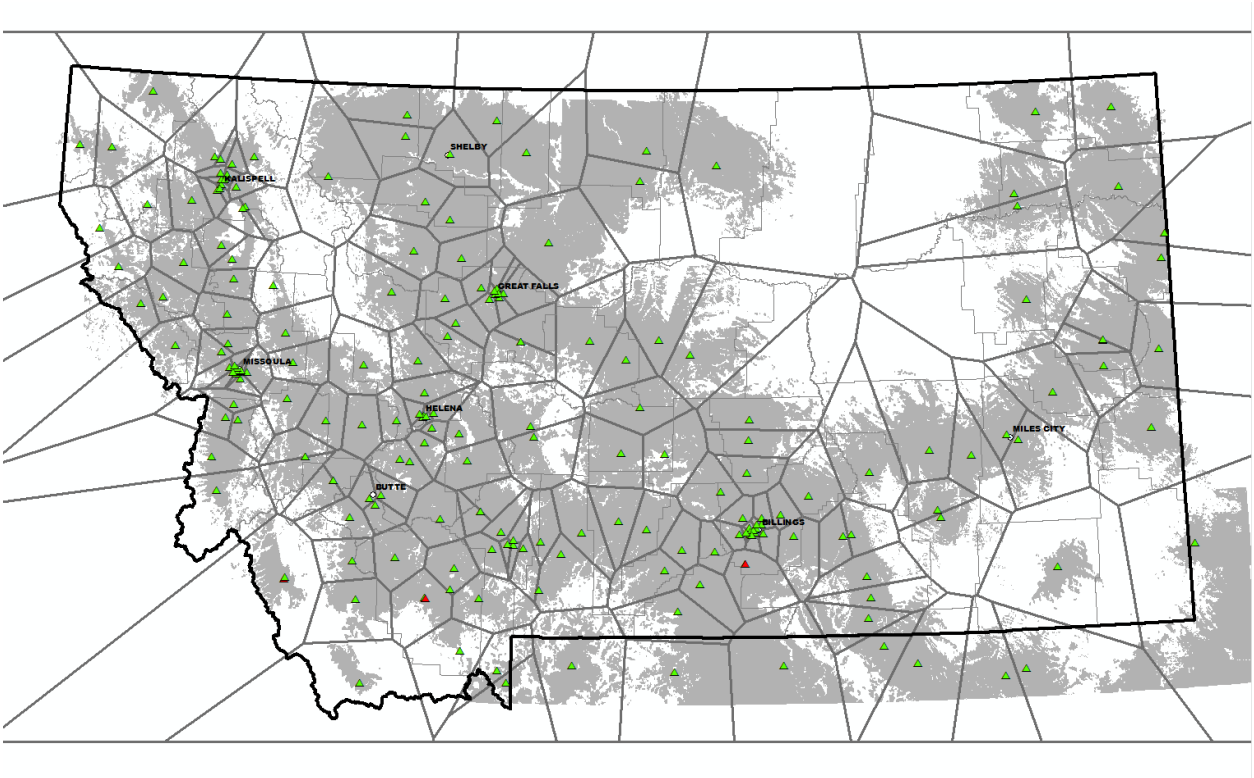


Figure 19 - Thiessen Polygons for AT&T Suspected Cell Tower Locations

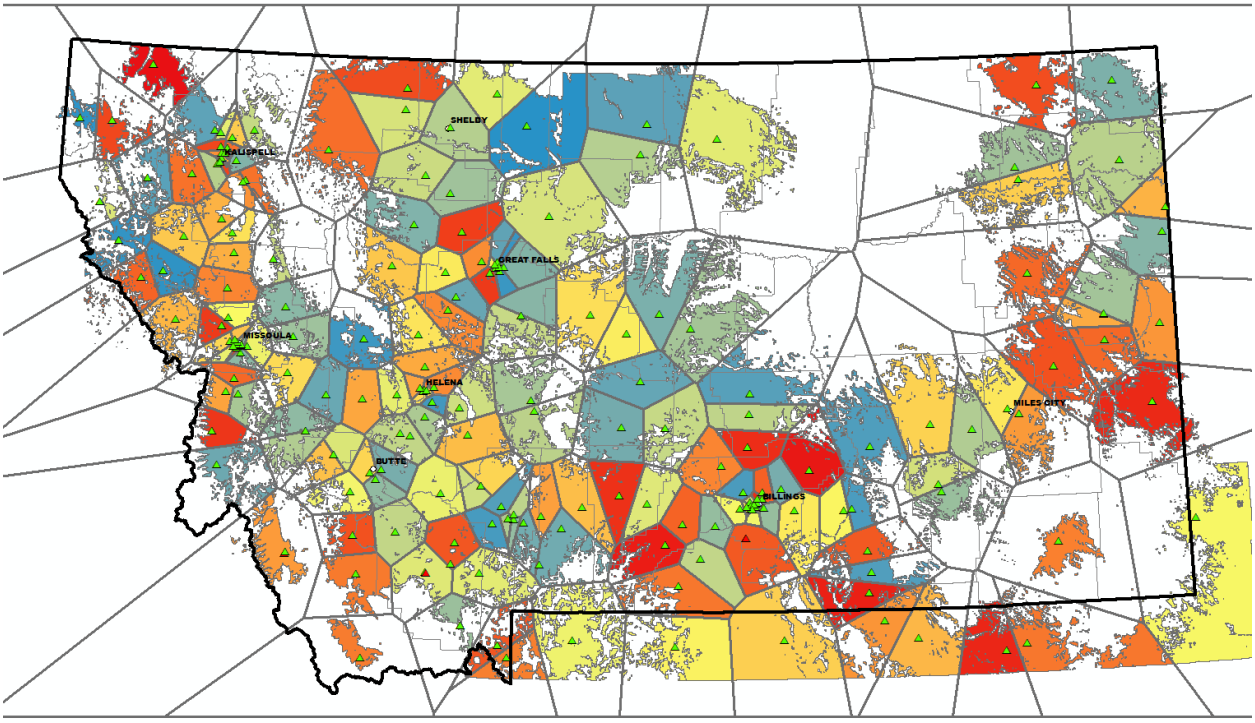


Figure 20 Thiessen Polygons by Tower intersected with AT&T web map coverage

The final AT&T tower/antenna feature class contained 207 records from the following sources including the number in each:

- FCC Universal Licensing System (130)
- FCC Antenna Structure Registration (70)
- AT&T Tower Website (5)
- TowerCo Website (2)

Most towers, 181 of 207, had a documented tower/antenna height (via FCC ULS, FCC ASR, or TowerCo), the remaining 26 were assigned an average height based on their location within or outside of city limits. Eight towers located outside the state were included in the propagation model because their coverage extended into the state, but these tower/antenna locations are not included in the Montana Middle Mile feature class. In total, 130 of 207 towers were run in the Cellular spectrum (from FCC ULS) and 77 towers were run in the Broadband PCS spectrum (by a process of elimination along with data submitted by AT&T).

A propagation model was run for each suspected AT&T tower location using the known and best assumed parameters. The National Elevation Data formed the base for the propagation models at one-third arc second. The resulting propagation prediction

coverages were merged in ArcInfo to create two statewide coverages representing AT&T's 4G (HSPA+) and 3G data. The tower locations that appeared to be the source for AT&T's 4G (HSPA+) coverage were attributed as such and the same process was followed for the 3G data.

The AT&T towers were then placed on top of the AT&T coverage feature class created from the propagation model. Gaps in the coverage indicating a potentially missing tower were researched and added where necessary. This coverage was compared to AT&T's on-line coverage map (www.wireless.att.com/coverageviewer). We also compared the coverage to the results of our independent testing of signal strength and data transfer speed testing. Both comparisons generally matched the propagation model we generated.

The State of Montana Broadband Mapping Project decided to use the independently generated mobile wireless coverage for AT&T for the Spring 2013 submission.

Satellite

The parameters below show the satellite wireless models for MT. A few satellites use the same azimuth and altitude, so they only need to be run once and subsequently copied and renamed for different providers. There was one coverage for WildBlue and Starband, and four coverage for Hughes/DirectTV. The Anik-F2 satellite appears to be shared by Hughes and WildBlue coverage, and was listed under both.

The process included running a hillshade with the parameters shown below, selecting the "Model shadows" parameter. This was reclassed into 3 classes 0,1,Max value. Then the Majority filter model in Spatial Analyst Generalization was run with a 4x4 neighborhood grid to filter out the smallest isolated shadow pixels. A conditional selection of the class 0 (shadow values) was made for the final grid. This was run through a raster to polygon conversion and added to the master coverage template from geodatabase.

Provider	Satellite	Azimuth	Altitude	Operator
Hughes / DirectTV				
	Anik-E2	141.6	33.7	Telesat Canada Ltd.
	Anik-F2	181.8	36.13	Telesat Canada Ltd.
	Spaceway-1	170.6	35.68	Direct TV, Inc.
	Spaceway-3	160.1	34.17	Hughes Network Systems
WildBlue				

Anik-F2	181.8	36.13	Telesat Canada Ltd.
Wildblue 1	181.8	36.1	Wildblue Communications
Starband			
Echostar 9	195.1	35.03	Echostar Technologies, LLC

Skycasters LLC satellite coverage was added based on instructions from NTIA on September 11, 2012. The coverage modeled for Hughes/Direct TV was used to approximate Skycasters satellite coverage since the satellite coverages are all very similar.

Community Anchor Institutions

Lists were obtained from the state and affiliated processional organizations for anchor institutions to be included in the broadband mapping in each of the community anchor institution community code categories. These were sorted and cross referenced and an initial round of elimination of duplication was accomplished.

All institutions on the initial draft spreadsheets used for the first two submittals were geocoded using ESRI Business Analyst Desktop with the USA Geocoding engine using TeleAtlas premium road features. This was judged to be the best available geocoding source for batch processing of addresses. No commercial source is 100% accurate in a primarily rural state such as this with low population numbers compared to other states and no large cities or metropolitan statistical areas. In subsequent rounds of updates since the first two submittals, we have used the same geocoding engine from Esri Business Analyst, but the geocoding locator switched to NavTech geocode locator. In every round of geocoding we used conservative matching criteria, and maintained and stored the type of match (building match, address match, or zip code match), along with a record of those not matching and not able to geocode.

All geocoding is dependent on accurate road locations and complete and accurate street segment attribution. The GIS road layers available from the state were not judged as complete as the premium commercial sources. The Tiger 2009 road files, while spatially comparable to the commercial sources, have a large percentage of null values in the database attribution and street segment address ranges necessary for accurate geocoding. As in most parts of the country, geocoding is more accurate in urban settings than in rural routes. Complicating the process in a rural state for anchor institutions are the situation where some anchor institutions, such as public safety anchors are often staffed by volunteer staff and a post office box is the only valid address, and the physical address is wherever the public safety equipment is parked or stored at any given point in time.

Category codes were assigned based on the original source list and from keywords in the name of the institution and independent research. Technology of transmission and advertised speeds were obtained when possible, which initially was entirely based on the anchor institutions maintained by the state for consortiums providing state service contracts. Two iterations were accomplished with these state maintained lists, and all available attributes were obtained with assistance of the state analysts.

After initial data collection, analysts worked on researching, calling and improving the addresses for those below an 80% match criteria. Many in the 70% matching range were fairly accurately located. The difference between a 70% and 80% match typically occurred when an address lacked a prefix or suffix cardinal direction on a street that had two cardinal directions (example 101 1st Street, on a street segment with 101 N.

1st Street and 101 S. 1st Street). Analysts were also able to obtain physical addresses for some lists supplied by the state with only a P.O. Box.

The lists with updated and corrected addresses were re-geocoded for the final mapping effort, and any anchor with any level of geocoding was included on the final map. The operational database identifies the type of match, so future maintenance cycles can be prioritized and targeted to those matching only zip codes or with address changes.

From the results of the previous step some attribution of database attributes for attributes with null values was accomplished. This step was rule based. The attribute of whether an anchor institution subscribes to broadband service could only authoritatively be answered yes, if the information was provided by the state, or a confirmation from an anchor speed test could be matched. Those anchors that were located within an area covered by a DSL, cable, other copper or fixed wireless were also assumed to have the ability to subscribe to broadband coverage and were also estimated to be subscribers. Assigning the technology of transmission and the advertised speeds (which required identifying a provider for the anchor institution) was only possible on a subset of all coverage in those areas where only one provider/technology of transmission was present. This allowed a few hundred more anchors to be identified, but typically only occurred in rural settings. Most urban settings had multiple providers. In addition many providers submitted multiple technology options, so identifying one provider/technology of transmission combination was not possible even if there was only one provider possible for the anchor institution.

It is likely that in some instances in the rural settings and small towns an anchor institution may rely on mobile wireless broadband. This is common in public safety mobile equipment such as vehicles, but likely less common in anchor facilities. For the purpose of assigning attribution to anchor institutions with remaining null attributes, we took a conservative approach and did not overlay anchor institutions on mobile wireless coverages to assign attributes.

Maximum advertised downstream and upstream speeds were not available or collected for any of the CAIsA new domain value of “U” for Unknown was added to the data model for the current submission, and all values formerly coded as 0, were changed to “U”. A new optional attribute was requested by NTIA for the current submittal requesting knowledge about the presence or absence of WIFI at the CAI location. This was not researched and attributed by the state in the current submission. All records were set to “Unknown” for the attribute Public Wi-Fi.

In the first two submission processes for geocoding we used conservative matching criteria, and maintained and stored the type of match (building match, address match, or zip code match), along with a record of those not matching and not able to geocode. The subsequent submission was completed by state analysts, and new additions to the list were not geocoded. The additions of new anchor institutions in this submission

were assigned their latitude and longitude geographic location based on their location used in the Montana Structures Framework.

A new optional attribute was requested by NTIA after the initial maintenance updates requesting a CAI unique identification number for K-12 schools, libraries and colleges and universities. The following steps were completed for this request.

1. Added CAIID for the Library category using a combination of the FSCSKEY and FSCS_SEQ number attributes from http://harvester.census.gov/imls/data/pls/index.asp. Added 49 records using the Montana Structures Framework to assign their geographic location.

2. Added CAIID for the University, college, other post-secondary category using the NCES IPEDS ID from http://nces.ed.gov/ipeds/datacenter/. Added 10 records using the Montana Structures Framework to assign their geographic location.

3. Added CAIID for the School – K through 12 category using the NCES ID CCD ID from http://nces.ed.gov/ccd/bat/ . Added 118 schools using information from the OPI Schools http://www.publiclibraries.com/montana.htm list, the NCES Schools List and the Montana Structures Framework. NOTE: NTIA asked that each school be given a unique ID but in the CAI table, many schools at the same address were combined. These were not separated for this round of the NTIA submittal.

A new optional attribute was requested by NTIA for the current submittal requesting a URL for each anchor institution.

Assigned URLS to CAI records: for the University, college, other post-secondary category assigned the actual URL for that institution; for the Library category added a standard URL (http://www.publiclibraries.com/montana.htm); for the School – K through 12 category added the OPI URL (http://opi.mt.gov/Resources/Directo the 2011 update cycry/Index.html); and for other institutions, added an appropriate URL for the type of CAI.

The State of Montana assigned administrative staff to update the anchors during the 2011 update cycles. They eliminated duplicate entries, added additional schools based on Office of Public Instruction data, and updated the NCES codes.

Middle Mile

Middle mile and backhaul points were included for all public data and provider submitted infrastructure judged to be reliable and valid. A systematic reliability (geographic scale and authority of the source) rating and a validity rating (cross referencing between multiple sources) were developed and used throughout the project, both on a scale of 1-

10, along with feature level metadata to maintain the last point of aggregation. A persistent unique identifier was used to track each point and each instance of a point as they moved through the system and improved in quality. Old points were retired but were not deleted from the operational database. Only active records were used in the final processing.

A feature class labeled "Last point of aggregation" (LPA) in the operational database was created to hold point locations of broadband infrastructure (examples include central offices, remote terminals, head ends, etc.). Addresses purchased or obtained at any level of geography were geocoded to a street address (using ESRI Business Analyst and TeleAtlas data) or located more generally to the center of a town (snapped to the USGS Geographic Names Information System location) when no address information was available. All mobile wireless locations obtained from public sources or commercial sources that were not already validated were confirmed using NAIP aerial imagery and Google Street View (when available). All FCC tower locations included a latitude and longitude, however all towers were validated and moved to the NAIP aerial imagery location.

A reliability code indicating the source and geographic scale represented as an integer from 1 (low) to 10 (high) was assigned. Validity codes were assigned cross-referencing public and provider data submissions; it was also rated on a scale of 1-10. A point with a validity code of 7 that fell within a provider's coverage for DSL, mobile or fixed wireless, or was used in a final modeled coverage was included in this table. In addition, backhaul points identified by the state, by providers and consortiums providing services to the state and anchor institutions, were included in the table. Providers were typically reluctant or unwilling to provide infrastructure data, and often unwilling to confirm data obtained through public sources. The methods used in the state allowed a significant level of identification and mapping of infrastructure locations and feature level metadata on reliability and validity of point locations, but data on owned or leased characteristics, serving facility codes, and for elevation of infrastructure was confirmed by few providers who responded directly in a spreadsheet provided to them to list infrastructure.

Speed Test Data Processing

A public facing website was created in the spring of 2010 asking internet users in the state to complete a brief survey regarding their internet connection and run a speed test on their connection using the Ookla speed test. The speed test site asked that a user enter their location as an address on a Google map interface. If the address did not geocode to their satisfaction, the user could choose to move the place mark to their desired location. Next, users were asked to select their technology of transmission from a list, enter their provider in a free form text field, complete an optional questionnaire, and run a standard speed test on their connection. The date and time, and IP address of the user were captured during the speed test.

All speed tests were geocoded, and the IP address was looked up in batch mode in the WHOIS database returning one or two providers registered with WHOIS. All speed tests were cleaned and analyzed against provider submissions and models. For the first two submissions a final provider assignment was assigned by examining the WHOIS fields, and the provider submitted by users. Consistent rules were not always possible, but generally when two WHOIS records were returned, the second more specific WHOIS provider was selected. In some instances, where the WHOIS providers were backhaul or other and were not providers meeting the NOFA criteria, the user submitted provider designation was cleaned and standardized and assigned as the final provider.

There was considerable variation between the user reported technology of transmission (TOT) and the known technologies for any given provider. Records were divided on unique provider/ TOT combinations for the first and second submissions, which limited the record count in many instances. For the current submission the records were divided only by provider, not taking TOT into consideration.

For the first two submissions, the speed test records were used in two ways for the final processing.

1) As an independent measurement to validate the presence/absence of a provider coverage for DSL and/or Cable technologies.

In the first submission a few providers were identified as DSL broadband providers based primarily on speed tests. In these instances, DSL models were executed for both providers based on verified central office locations. Some speed tests with an identified technology of transmission of Cable Modem were used to expand “likely” cable areas which were typically adjacent to incorporated and urban areas. These “cable-plus” areas were created to supplement submissions from Cable Modem providers who did not provide detailed coverage or census blocks. No new DSL providers or Cable providers were identified using speed tests in the current submission.

2) As an independent measurement for typical upload and download speeds.

Once data were cleaned and final provider and technology of transmission assigned, these fields were concatenated. In the first two submissions, if the remaining records exceeded 10 for the combination of provider and technology, and the speed test was successfully completed (values > 0) the average value and standard deviation of the download speed were calculated. Any values exceeding 1 standard deviation were removed as outliers, and the mean of the remaining records within 1 standard deviation was calculated for the download and upload speed. This value was reported for each provider/technology of transmission record as the typical speeds for that provider. In some instances the typical speed was lower than that required to meet the definition of broadband by NTIA, but that did not preclude the records from being included in the broadband map in the first two submissions as it did in the current submission.

For the current submission, these procedures were modified and all records were re-run. The steps of the current processing are provided below. The primary procedural change was to drop the validation of the presence/absence of provider coverage for DSL and/or Cable technologies, since providers had been validated in the first two submissions and potential new providers identified through additional speed tests were determined to not meet the NOFA criteria for being considered a broadband provider. The use of the speed test data for determining typical speeds was implemented with similar rules as the first two submissions with the exception of the use of the technology of transfer, and raising the minimum number of speed tests to 15, after removing outliers, to be used in typical speed calculations. Procedurally, the process was also automated with a Python script to improve processing performance and minimize quality control/quality assurance testing.

Typical upload and download speeds for all providers with less than 15 processed speed test records were coded as null values. In addition, based on telephone communication with NTIA on March 9, 2011, all typical speeds less than minimum NOFA upload or download speed criteria were also ignored and reported as null. Based on a related request in the same communication, the typical speeds greater than the advertised speeds were ignored and reported as null. Subsequently on March 17, in the NTIA grantee webinar, the NTIA staff indicated that typical speeds would not be compared to advertised speeds. Processing steps for the current submission are provided below:

1. Speed test records were imported into a SQL Server data file, adding fields Final Provider and IPGroup to the initial records.
2. IPGroup attribute was set by extracting the left three nodes of the IP Address of the speed test (e.g. 161.7.1.236 had 161.7.1) moved to the IPGroup attribute.
3. An IPGroup to Final Provider cross reference table was created to determine the final provider from the unique three part IPGroup (e.g. 161.7.1 is known to be the State of Montana).
4. Each IPGroup was reviewed with the data in the WHOIS 1 provider, WHOIS 2 provider and then the user specified provider to determine the most authoritative final provider from the official list of providers. None of the WHOIS or user submitted fields were absolutely authoritative in all instances, so expert opinion by technicians knowledgable of the providers was used in some instances to assign the IPGroups, and subsequently the Final Provider attribute.
5. Run a python script to remove outliers and calculate summary statistics for each Final Provider assignment. The rationale for removing outliers was to mitigate the many variables that effect a typical speeed test, such as the time of day, others on the network, etc. The script implemented the following work flow rules:
    a. Use all records for each unique FinalProv attribute value with D_kbps greater than 0 or U_kbps greater than 0 , then:
    b. Calculate a mean for the unique provider group for each D_kbps and U_kbps.

   c. Calculate a standard deviation for the unique provider group for each D_kbps and U_kbps. Each speed attribute was calculated independently of the other.
   d. Subtract the outliers (if any) higher or lower than one standard deviation from the mean.
   e. Calculate the median value of the remaining non-outliers for each provider D_kbps and U_kbps respectively.
   f. Create a summary table with the final calculated assignment of FinalProv, D_kbps and U_kbps.
6. Post process the summary table in the following sub steps:
   a. Join the summary tables by provider for the upload and download speeds into one summary file including the number of records or frequencies for up and down speeds for each provider after removing the outliers, and the mean up and down speeds in kilobits per second for each provider.
   b. Select "FreqDown" < 15 AND "FreqUp" < 15 then delete the resulting selection set from the joined table. The FreqDown/Up fields counted the number of speed test records for a provider after the outliers more or less than one standard deviation from the mean value were removed from consideration.
   c. Select "D2_kbps" <= 768 kbps AND "U2_kbps" <= 200 kbps. then delete the resulting selection set from the joined table.
7. Import the remaining valid mean values for each provider into the appropriate broadband coverage feature classes.
8. Select any typical speeds greater than advertised speeds either up or down, and make the resulting records null in the final broadband coverage feature classes (as per NTIA request 3/9/2011).

Reliability, Validity and Completeness

Throughout the course of the broadband project the State of Montana has employed several validation and verification techniques to help quantify the accuracy of the broadband map. The techniques used are listed below:

- Reliability Codes Assigned to Infrastructure Points
- State Run Speed Test Portal
- State Wide Broadband Survey

Reliability codes apply to the source data points and polygons and assess the authority of the source we obtained the data from and the level or coarseness of the geography (address or town). Validity codes are determined from cross checks of data sources and the number of independent sources of verification. These are as simple as comparing speed test locations against DSL modeled polygons, or as complex as geospatial analysis operations such as a kernel density function cluster analysis. Completeness is determined by public sources, independent measurements or provider

submittals and checks on the domain classes required for the final NTIA deliverables such as Technology of Transmission domains, Speed Test domains and serving facility and wireless spectrum facility types and categories. The categories for these, and the subsequent records in our operational geodatabase tables grow and change as new data is obtained. We are maintaining these as feature level metadata tied to points and polygons maintained by analysts and technicians in a wiki table and coding them to the geodatabase. In this way the unique situations that arise can be cataloged and maintained with some level of flexibility while contributing to the final indices in a controlled fashion.

Reliability Codes

The two factors incorporated in reliability codes include the level of geography that was used as a source or provided as a clarification of location and the authority of the source for the information. We are also considering clusters of point information from independent measurements and sources to be higher in reliability than individual point information.

Generally, the coarser the source geography the lower the resultant score. Everything besides an address or street intersection, latitude/longitude location, or location provided in a georeferenced digital source is assigned a reliability score less than 5. This applies to source data coming (e.g. a central office located in a city instead of an address) and review comments on a previously mapped location (e.g. “That location is wrong, I know it is on the south side of town”).

We have incorporated the reliability code into our last point of aggregation (LPA) and provider coverage geodatabase files, and into some of the publicly available data (PAD) geodatabases. We are also carrying a short text field (50 characters) with a descriptive rationale for the score. This will allow us to focus more on the lower scores that need to be confirmed, and ignore the high confidence data scored as 9 and 10.

Reliability Codes		
Code	**Description**	**Detailed Description**
0	Not assigned	• Not yet assigned
1	Level 1	• Checked but unverified
2	Level 2	• County • Presence by other coarse geography (e.g. administrative region)
3	Level 3	• City • Census tracts • Cable Plus (area likely to have been annexed into an incorporated town or CDP)

4	Level 4	• Cable - incorporated • Zipcodes • Census blocks
5	Level 5	• GeoTel unverified • Confirmed by provider or anchor institution key advisor but to geography coarser than address or intersection
6	Level 6	• Qwest/Midcontinent or other web site random testing check • Speed test from individual average residential
7	Level 7	• From anchor institution key advisor Webex • GeoTel verified address only with no 3rd party confirmation from public sources ○ Building unverified • Speed test from anchor institution

8	Level 8	• From provider
		• FCC ULS or ARS
		• Geotel verified address and possibly verified by 3rd party source (Google Streetview)
		  ○ Another provider's sign is on building (usually Qwest)
		• Geotel possibly verified by 3rd party source (NAIP, Google Streetview)
		• From state authoritative public data source (e.g. DCN or SummitNet)
		  ○ Address or building unverified
		• Speed test from cluster of average residential

9	Level 9	• From provider as coverage with authoritative confirmation
		• Geotel verified address and verified by 3rd party source (NAIP, Google Streetview)
		  ○ Provider sign on building
		  ○ Tower or dish visible
		• From provider or anchor institution check of our data * Root Wireless

10	Level 10	• From 2+ authoritative confirmations

Validity Codes

We included validity codes in the last point of aggregation infrastructure data which drives creation of the DSL models. We also included validity codes in each of the final technology of transmission deliverables for polygons and point feature classes. The scales of validity vary by each major type and function.

Infrastructure Validity Codes

The purpose of this validity code is twofold:

1. To determine which infrastructure points are turned into DSL model coverages
2. To use as a reference in other coverage validity checks

Infrastructure Validity Codes		
Code	**Description**	**Detailed Description**
0	Level 0	• Not yet assigned
1	Level 1	• Not yet assigned
2	Level 2	• Not yet assigned
3	Level 3	• Checked against MT PSC Report or DSLReports at the town level • Checked against SummitNet anchor institution data
4	Level 4	• Checked against two or more independent public sources at the town level • Checked against provider public data (e.g. Qwest ICONN) at the town level
5	Level 5	• Not yet assigned
6	Level 6	• Confirmation of DSL or cable from authoritative public data to broader geography than address not confirmed by provider
7	Level 7	• Authoritative public data at address level (e.g. Geotel) not confirmed by provider
8	Level 8	• Provider submission at the census tract level • Provider website independent address checks (Qwest, Verizon)
9	Level 9	• Provider submission at the census block level or address level
10	Level 10	• Provider submission at the coverage level at census block scale or blocks less than 2 square mile and larger scale then census block for blocks larger than 2 square miles

Final Technology of Transmission Validity Codes

The purpose of this validity code is twofold:

1. To determine which elements are loaded in the spreadsheet provider submission packages in their review
2. To determine which provider coverages are chosen for submittal with one of the NTIA deliverables (April 15, June 24)

Final Technology of Transmission Validity Codes		
Code	**Description**	**Detailed Description**
0	Not assigned	• Not yet assigned
1	Level 1	• Unassigned at this time
2	Level 2	• Unassigned at this time
3	Level 3	• Checked against MT PSC Report or DSL sources at the town level • Checked against SummitNet anchor institution data
4	Level 4	• Checked against two or more independent public sources at the town level • Checked against provider public data (e.g. Centurylink ICONN) at the town level
5	Level 5	• Confirmation of DSL or cable from authoritative public data
6	Level 6	• Provider website independent address checks (Qwest, Verizon) • Provider submission at the census tract level
7	Level 7	• Provider submission at the census block level • Provider submission at the census block level confirmed by Speed test cluster OR other independent measurement
8	Level 8	• Provider submission at the address level
9	Level 9	• Provider submission at the address level confirmed by Speed test cluster OR other independent measurement
10	Level 10	• Provider submission at the address level confirmed by Speed test cluster OR other independent measurement

Quality Assurance Testing

A separate analyst checked each provider submission. Due to the variety of provider submissions, the analyst originally doing the work and the analyst checking discussed the interpretations when the criteria were subject to interpretation.

Coverage, technology of transmission, and speed tier were checked completely for each provider.

Many of the models and block, tract and coverage level processes were completed with ESRI Modelbuilder and Python scripts, and these methods were tested for quality assurance in the preliminary mapping stages and in the initial sample data submissions to NTIA.

All providers who submitted geographic coverage coarser than a census block were provided a data checking package to assess for accuracy and completeness. Any comments received from providers were processed.

1. QA/QC Checks prior to Individual Data Processing (i.e., block or coverage geoprocessing model). [Automated Modelbuilder tools and follow-up by an analyst]
    a. Check for inconsistencies within the Provider Name, DBA Name, FRN
    b. Check for duplicate census blocks or coverage areas
    c. Check the Provider Name, DBA Name, FRN against the "Official Provider Table"

2. For each provider after initial data processing is completed [Review by an analyst that did not process the original data]
    a. Review correspondence log
        i. Review recent correspondence, since previous NTIA submission
        ii. Note changes/additions/comments on coverage area, technologies, speeds, infrastructure, subscriber weighted nominal speeds (SWNS)
    b. Review wiki data processing page (current metadata)
        i. Note changes/additions/comments on coverage area, technologies, speeds, infrastructure, SWNS
    c. Review individual Provider Wiki page (historic metadata)
        i. Note changes/additions/comments on coverage area, technologies, speeds, infrastructure, SWNS
    d. Check Provider Data Folder
        i. Review recent data submissions, since previous NTIA submission
    e. Check Working Data Folder
        i. Review current update feature class geography
        ii. Review coverage with provider's submissions
        iii. Review technology of transmissions (TOTs) with provider's submissions
        iv. Review Max Adv Speeds: Down/Up with provider's submissions

3. For each provider after final data processing is completed [Review by an analyst that did not process the original data]
    a. Check PROVCOV_Master geodatabase:Provider Blocks feature class and/or Provider Coverage feature class
        i. Review geography
        ii. Review TOTS
        iii. Review Max Adv Speeds: Down/Up

4. Check Infrastructure feature class [Review by an analyst that did not process the original data]
    a. Review recent submissions, since previous NTIA submission

5. Check SWNS feature class [Review by an analyst that did not process the original data]
    a. Determine if provider submission is valid

6. For each provider after speed tests are processed [Review by an analyst that did not process the original data]
    a. Check PROVCOV_Master geodatabase for Typical Speeds: Down/Up

7. QA/QC Checks and Reports on the Final NTIA Deliverable [Automated Modelbuilder tools and follow-up by an analyst]
    a. Check the Provider Name, DBA Name, FRN against the "Official Provider Table" for each NTIA feature class (i.e., BB_Service_CensusBlock, BB_Service_RoadSegment, BB_Service_Wireless, etc.). NTIA_Provider_Name_DBA_FRN_Errors_Sample.xls, looks at each NTIA feature class (i.e., census blocks, road segments, wireless, etc…) and checks to see if there is an identical match in the "Official Provider Table." If an identical match does not exist for that Provider Name, DBA Name, FRN concatenation it is written to a geodatabase table along with the NTIA feature class where the "error" occurred. When an "error" does occur it then has to be checked by an analyst and corrected if necessary.
    b. Change Detection Report – This geoprocessing model compares and reports any changes in the Census Block, Road Segment, and Wireless feature classes for the current and previous versions of the NTIA SBDD Transfer database. The user needs to supply the feature classes for each NTIA version as well as the name of the final change detection table. NTIA_Change_Detection_Example.xls, compares and reports any changes (limited to Provider Name, DBA Name, FRN, TOT combinations) in the Census Block, Road Segment, and Wireless feature classes for the current and previous versions of the NTIA SBDD Transfer database. If the final change detection table has no records, then no changes were detected between the two databases. If a Provider Name, DBA Name, FRN, TOT combination does not have a "pair" in either direction (the current or previous NTIA database) then it is written to a geodatabase table along with the NTIA feature class and version where the "error" occurred. This report does not change any data in either database but rather acts as a flag, requiring an analyst to check if the "error" is valid.
    c. Check for duplicate census blocks or road segments or wireless coverage areas.
    d. Check for duplicate anchor institution points.

8. Review Final NTIA deliverables [Review by an analyst that did not process the original data]
    a. Review BB_ConnectionPoint_MiddleMile
    b. Review BB_Service_CAInstitutions
    c. Review BB_Service_Census Block

d. Review BB_Service_Overview
e. Review BB_Service_RoadSegment
f. Review BB_Service_Wireless

9. Run the NTIA Check submission tool and python tool to confirm that all possible records passed the NTIA data checks. The only items that failed in the checking process were those where inconsistencies in the final NTIA NSGIC data model did not agree with the final documentation and rules established by NTIA and FCC in the final webinar and documentation presented March 17, 2011. These exceptions were documented along with the submission.

Appendix A

Potential providers researched but subsequently identified as not providing broadband service.

Company Name	Filing Company DBA	FRN	URL
5LINX Enterprises Inc. DBA Globalinx	5LINX Enterprises, Inc.	0015304645	www.5linx.com/products
8x8, Inc.	8x8, Inc.	0007099773	www.8x8.com
Access Point Inc.	Access Point Inc.	0004057352	www.accesspointinc.com
Accessline Communications Corporation	Accessline Holdings, Inc.	0015982366	www.accessline.com
ACN Digital Phone Service, LLC	ACN, Inc.	0015312606	www.myacn.com/index.html
All Digital Telecom, Inc.	All Digital Telecom, Inc.		none
Alltel Wireless	Alltel Wireless		www.att.com
Ameripages, Inc.	Ameripages, Inc.		none
AmeriVision Communications, Inc.	AmeriVision Communications, Inc.		http://www.affinity4.com/
Aptela, Inc.	Aptela, Inc.	0015304850	www.aptela.com
AT&T Corp.	AT&T Inc.	0004496774	www.att.com
B2B Advantage, Inc.	B2B Advantage, Inc.		http://www.b2badvantage.net/b2b/index.asp
Bandwidth.com, Inc.	Bandwidth.com, Inc.	0015443773	www.bandwidth.com
Big Sky Wifi, Inc.	Big Sky Wifi, Inc.		www.3rivers.net
BigHoof New Media	BigHoof New Media		none
Birch Telecom	Birch Telecom		www.birch.com
BroadvoxGo!, LLC	BroadvoxGo!, LLC	0017679523	www.broadvox.com

Broadwing Communications, LLC	Level 3 Communications, LLC	0008599706	www.level3.com
Bulldog Cable	Bulldog Cable		www.bulldogcable.com
BullsEye Telecom, Inc.	BullsEye Telecom, Inc.	0004350930	www.bullseyetelecom.com
C-A Information Systems Inc.	C-A Information Systems Inc.		www.consumer.hughesnet.com
Cable & Communications Corporation d/b/a Mid-Rivers Wireless	Mid-Rivers Telephone Cooperative, Inc.	0001634443	www.midrivers.com
Call Catchers Inc.	Call Catchers Inc.	0016109803	none
Cause Based Commerce Incorporated	Cause Based Commerce Inc.	0015173503	www.causebasedcommerce.com
COMCAST CABLE COMMUNICATIONS, INC.	Comcast Corporation	0003768165	www.onlinecomcast.com
CommPartners, LLC	CommPartners Holding Corporation	0011045127	www.commpartnersconnect.com
Contact Communications	Contact Communications		none
CRJ Communications Indications Corp.	CRJ Communications Indications Corp.		none
Dialog Telecommunications	Dialog Telecommunications		none
DSLnet Communications, LLC	Megapath, Inc.	0004324851	www.megapath.com
EarthLink	EarthLink	0015192453	www.earthlink.net
ECR Voice, LLC	ECR Voice, LLC	0015518129	www.ecrvoice.com
Engineered Communication	CommPartners Holding	0019615400	www.commpartnersconnect.com

Systems, Inc	Corporation		
Ernest Communications, Inc.	Ernest Communications, Inc.	0004948642	www.ernestgroup.com
Essen Communications Corporation	Essen Communications Corporation		www.essencommunications.com
Fionda VOIP, LLC	Fionda VOIP, LLC	0015321961	www.fionda.com
First Communications, LLC	First Communications, LLC	0003764487	www.firstcomm.com
Get Mobile	Get Mobile		none
Gilat	Gilat		www.gilat.com
Global Crossing Telecommunications, Inc.	Global Crossing North America, Inc.	0002850519	www.globalcrossing.com
Granite Telecommunications, LLC	Granite Telecommunications, LLC	0008676975	www.granitenet.com/ProductsAndSolutions/Pages/Broadband.html
GreatCall, Inc.	GreatCall, Inc.	0018554386	www.greatcall.com
Greenfly Networks, Inc.	Greenfly Networks, Inc.	0015808736	www.clearfly.net
HughesNet	HughesNet		www.consumer.hughesnet.com
iCore Networks, Inc.	iCore Networks, Inc.	0015340326	www.icore.com
IDirect	IDirect		www.idirect.net
IDT Corporation	IDT Corporation	0003790037	www.idt.net
InPhonex.com, LLC	InPhonex.com, LLC	0010488351	www.inphonex.com
Integra Telecom	Integra Telecom		www.integratelecom.com
Internet Montana	Internet Montana		www.imt.net/services/dsl.html
Ionex Communications North, Inc.	Birch Communications Inc.	0005027305	www.birch.com/about/
IP Networked Services, Inc.	IP Networked Services, Inc.	0016088882	none
iSmart Mobile	iSmart Mobile	001910	www.smartcall.us

LLC	LLC	7051	
Jefferson Broadband	Jefferson Broadband		www.cutthroatcom.com
Kosmaz Technologies LLC	Kosmaz Technologies LLC	0014855084	www.kosmaz.com
LightSquared LP	LightSquared LP	0007705742	www.lightsquared.com
Lightyear Network Solutions, LLC	LY Holdings, LLC	0010045128	www.lightyear.net
LinkStar	LinkStar		www.viasat.com
Matrix Telecom, Inc.	Matrix Telecom, Inc.	0004333068	www.matrixbt.com
Metropolitan Telecommunications Holding Company	Metropolitan Telecommunications Holding Company	0009806019	www.mettel.net
Millicorp	Millicorp	0018930511	www.millicorp.com
Missouri Valley Communications, Inc.	Missouri Valley Communications, Inc.		www.nemont.net
Montana Advanced Information Network, Inc.	Montana Advanced Information Network, Inc.		www.vision.net
Montana Lincnet	Montana Lincnet		www.montanasky.net
Montana Wireless Inc.	Montana Wireless Inc.		none
Mountain West Internet Inc.	Mountain West Internet Inc.		www.mwtn.net
MTPCS, LLC dba Chinook Wireless	MTPCS Holdings, LLC	0013518741	www.cellularone.com
Multiband Communications, Inc.	Multiband Communications, Inc.		www.cutthroatcom.com
Navigator Telecommunications LLC	Navigator Telecommunications LLC	0004349924	www.navtel.com
New Cingular Wireless	AT&T Inc.	0003766532	www.att.com

Services, Inc.			
New Edge Network, Inc.	New Edge Holding Company	0003720471	www.newedgenetworks.com
nexVortex,Inc.	nexVortex,Inc.	0015282155	www.nexvortex.com
NOS Communications, Inc.	NOS Communications, Inc.	0004321006	www.nos.com
Omnicom Paging Plus, LLC	Omnicom Paging Plus, LLC		www.omnicom-paging.com
OnWav, Inc	OnWav, Inc	0018007898	www.onwav.com/home
OPCOM, INC.	OPCOM, INC.		wcstelecom.com
P.W.I. Holdings, Inc.	P.W.I. Holdings, Inc.		none
PAETEC Communications	PAETEC Communications	0003716073	www.paetec.com
Phone.com, LLC	Phone.com, LLC	0016845190	www.phone.com
Proximiti Technologies, Inc.	Proximiti Technologies, Inc.	0016431603	www.proximiti.com/default.aspx
QuantumShift Communications, Inc.	vCom Solutions	0004337523	vcomsolutions.com
Qwest Communications Company, LLC	Qwest Communications International, Inc.	0003605953	centurylink.com
Qwest Corporation	Qwest Corporation		centurylink.com
RNK, Inc.	Wave2Wave Communications, Inc.	0002477743	www.wave2wave.com
Sagebrush Cellular, Inc.	Nemont Telephone Cooperative, Inc.	0001608645	www.nemont.com
Skyland Technologies, Inc.	Skyland Technologies, Inc.		none

SoFast Internet Services, LLC.	SoFast Internet Services, LLC.		none
Sprint Nextel Corporation	Sprint Nextel Corporation	0003774593	www.sprint.com
Summit Wireless, LLC	Summit Wireless, LLC		none
Telesphere Networks Ltd.	Telesphere Networks Ltd.	0015328032	www.telesphere.com
Thinking Phone Networks, LLC	Thinking Phone Networks, LLC	0015343478	thinkingphones.com
Time-Warner	Time-Warner		www.timewarner.com
Trans National Communications International, Inc.	Trans National Communications International, Inc.	0004337846	www.tncii.com
tw telecom holdings inc.	tw telecom inc.	0014942668	www.twtelecom.com
UC	UC		www.integratelecom.com
Velocity Networks Inc	Velocity Networks Inc	0015327430	www.vel.net
Verizon Business Global LLC dba Verizon Business	Verizon Communications Inc.	0010856284	www.verizon.com
Virgin Mobile USA, LLC	Virgin Mobile USA, LLC		www.virginmobileusa.com/
Vivid Networks, Inc.	Vivid Networks, Inc.		www.lightnex.com/
VoIP360, Inc.	VoIP360, Inc.	0016868317	none
VoIPStreet, Inc.	VoIPStreet, Inc.	0016266157	www.voipstreet.com
Vonage Holdings Corp.	Vonage Holdings Corp.	0018401844	www.vonage.com
Western CLEC Corporation	Western CLEC Corporation		www.cellularone.com
Yellowstone Media Design	Yellowstone Media Design	0016059842	www.ymdesign.net
YMAX Communications Corp.	YMAX Communications Corp.		none

North Carolina Data Submission
Spring 2013

Data Collection Methodology

NC Broadband, a Division of the North Carolina Department of Commerce

04/22/13

NCbroadband

Table of Contents

Executive Summary

North Carolina's SBDD Grant

The North Carolina Department of Commerce is the designated Eligible Entity in North Carolina to receive funding under the State Broadband Data and Development (SBDD) grant program of the National Telecommunications and Information Administration (NTIA) of the U.S. Department of Commerce. North Carolina was awarded $6,610,996 in federal funding under this program through Award #37-50-M09002. This grant runs from October 1, 2009 – October 1, 2014.

North Carolina Department of Commerce

NC Broadband, a division of the North Carolina Department of Commerce, is responsible for implementation of the work under the SBDD grant. In this capacity, NC Broadband serves as the State Broadband Initiative for North Carolina. Work under the SBDD grant is being conducted by staff members of NC Broadband as well as the relevant contractors under the grant.

NC Broadband is responsible for implementation of the following programs as part of this grant:

- State Capacity Building
- Data Collection and Mapping of broadband availability
- Technical Assistance to communities
- Implementation of the LITE-UP Pilot Program
- Update of the NC Master Address File

The Department of Commerce is the state's leading economic-development agency, working with local, regional, national and international companies. The Department's mission is to improve the economic well-being and quality of life for all North Carolinians. The mission is carried out by serving existing business and industry, including providing international trade assistance; recruiting new jobs and domestic and foreign investment; encouraging entrepreneurship and innovation; marketing North Carolina and its brand; supporting workforce development; strengthening communities; and promoting tourism, film and sports development. The Department also provides data, statistics, information and reports for state government and agencies, which regulate commerce in the state. As such, the Department of Commerce is a natural fit to house the State Broadband Initiative for North Carolina, with broadband infrastructure being key to reaching North Carolina's business and workforce goals, and with broadband infrastructure being a critical component to allow all NC businesses and communities to participate in the global economy.

Spring 2013 Broadband Data Collection and Mapping Process

Data Collection

The official data request letter from the NC Department of Commerce was sent hardcopy in the mail to all identified providers of broadband service on January 24. An email version was distributed as well, on January 31. Providers were given a link to the relevant Webpage which housed: Data Instructions, the

Excel Data Template, the NC Department of Commerce Designation Letter, the Guidance Letter from NTIA from June 2011, and a file to download the 2010 Census Block GIS layer from NC OneMap. Providers were also reminded that they may choose to submit availability data by census block and street segment, considered public data under the grant program, or address-level data, and were asked to contact DOC with questions about confidentiality of data. Providers were asked to reply to the data request on or before February 15, 2013.
As mentioned above, Excel and geodatabase templates were shared with providers, along with PDF format instructions summarizing all NTIA requirements and information relevant to each type of provider (fixed wireless, mobile wireless, and wireline). Technical assistance was provided to any organization who requested it.

A secure server hosted by MCNC is configured with an open source, browser-based direct file upload system called eGroupware. Providers were sent a log-in name and password for this upload system once they contacted either Angie Bailey or Stephanie Jane Edwards to communicate that their data was ready for submission. A confirmation e-mail went to Stephanie Jane once data had been uploaded.

Individual reminder e-mails were sent, or phone calls made, to targeted providers. NC Broadband did use some previously-submitted datasets for providers that were unresponsive, or who asked that previous data be used for this round. The number of known broadband service providers operating in North Carolina is currently at 103, with several name changes, several providers being removed, and others being identified and added
Out of these 103 known providers, 75 now have broadband data in this statewide geodatabase. Several additional providers are in communications with NC Broadband, in an effort to produce usable data for upcoming data collections. Since the last data collection, the following providers have been removed from the list of identified broadband providers operating in North Carolina: Global Crossing, VanceNet, WBIA Internet Service, WindChannel Communications, and WorldEdge (these providers were all unresponsive prior to being identified as no longer active. Randolph Telephone Company (a participating provider) was also removed from the list, as it merged with its sister organization, Randolph Telephone Membership Corporation. Covad/DIECA is now MegaPath Corporation, and still reports broadband availability data for North Carolina.

Integration of Provider Data into NTIA Statewide Geodatabase

For ease of data integration, a front-end Excel format template was offered to all providers, containing notes defining required fields, explanations of which data is required in which formats by which types of providers, and hyperlinks connecting fields to additional tables listing the corresponding NTIA-specified values and codes (for speed tiers, technology types, connection point facility types and capacities, county codes, end user types). A brief description of how census block FIPS codes work was also taken from an internet source and distributed as needed to providers who had questions about how to report this information.

BB Service by Census Block

As requested by the NTIA mapping and planning team, all census block data is included with 2010 census block geometry. Technical assistance was often needed by providers to correctly report served areas by either the 15-digit FIPS codes or in some way by which NC Broadband staff could derive the appropriate FIPS codes.

BB Service Road Segment

The reporting and mapping of data by street segment presented significant challenges to accurate interpretation of where broadband availability is and is not. This is mainly attributed to the difficulty of standardization among the many data structures by which providers report street segments. Quality of data has improved since some providers have switched to submitting data in shapefile format, and others have been able to start including a Tigerline ID (TLID) field for reference in mapping tabular information. Use of this unique identifier has reduced ambiguity in some tabular datasets and improved data quality upon mapping.

BB Service Address

A few address-level datasets were submitted to NC Broadband with the latitude/longitude coordinates already determined in a spatial format, but most needed to be geocoded. This was done using the NC Master Address file as the primary reference file, significantly increasing the accuracy of matching records. Secondary sources for address records that did not find a match this way included street segment interpolation, ESRI data utilizing the 4-digit ZIP extension, and manual placement/digitizing based on a combination of reference data and online browser maps. Upon completion of geocoding for each provider submitting address data, the address point features were overlain with a 2010 census block layer to add the census block FIPS code attribute, then all address feature points were loaded into the geodatabase feature class. The geocoded shapefiles for each provider are kept with geocode match score and match reference type for every matched address, so the thoroughness of this data type could be tracked and/or improved with more time.

BB Service Wireless

Approximately nine small, fixed wireless providers have been able to share technical information about their transmitting towers, antennae, and frequencies, so that NC Broadband can produce for them a service coverage shapefile using the contracted services of the University of NC at Greensboro Center for Geographical Information Science (http://cgis.uncg.edu) . An Excel template was developed with all the relevant information that can be filled in by providers with technical assistance in some cases, and the propagation model is field-calibrated to reflect actual ground conditions.

BB Service Overview

Records for overview containing subscriber-weighted nominal speeds of a given provider were generally joined to a template layer of county features, using the option to keep matching records only. Then these matching features and their new attributes were exported as a new shapefile before being loaded into the collective overview feature class. For providers with multiple technology types serving a given county in at least one instance, this information was single-field geocoded using the 5-digit county FIPS code, and then geocoded point features were spatially joined to the county polygon using “within” criteria.

Some detail formatting performed as needed:

- Add state FIPS code and any needed leading zeros onto county code for the new State+County FIPS code. Most providers list just the county code because this was the original NOFA request.
- Change state abbreviation values from “37” to “NC”.
- Change weighted speeds to appropriate units (kbps) and remove unit text.
- Translate to county from weighted speeds reported by RSA/MSA.

BB Service - Critical Anchor Institutions

Only anchor Institutions that could be geolocated were included. Only 17 CAIs were identified that could not be geocoded to a point feature. CAIs were collected by contacting administrative offices of some CAI category types and receiving databases of information, as well as collecting from individual CAI locations for other types using survey emails and follow up phone calls as necessary. There are 6,839 CAI's identified, located, and included in the geodatabase to date. In this current data collection round, most CAI's are included as previously reported, and 156 senior centers were added.

Census Block data (tabular)

- Fields standardized and transferred into Excel template
- Geocoded to centroids of census blocks using 2010 Census Block layer in WGS1984 projection as reference file for "Address Locator".
- Spatial join of geocoded census block data points to polygon features

Street Data

Some datasets were submitted to NC Broadband by providers already in shapefile format, and others were reported in various tabular formats (text, Excel, CSV, etc.). Of the tabular datasets, some included a Tigerline ID ("TLID") field along with some or all other fields such as city, state, zip, and census block FIPS.

- For datasets submitted tabular with TLID:
    - Max and Min address ranges were calculated from the FromRight, ToRight, FromLeft, ToLeft format used by most standard street segment reference files and incoming datasets
    - All data formatted into back-end Excel format, including converted speeds if reported at some other granularity.
    - Table geocoded to Tigerline 2010 street segment file using single-field and "TLID" values, with zero offset.
    - Geocoded point features converted to street segment geometry via spatial join using "contains" criteria, keeping matched records only.
- For datasets submitted tabular without TLID:
    - Max and Min address ranges were calculated from the FromRight, ToRight, FromLeft, ToLeft format used by most standard street segment reference files and incoming datasets
    - All data formatted into back-end Excel format, including converted speeds if reported at some other granularity.
    - Table geocoded to Tigerline 2010 street segment file using false midpoint address and either ZIP5 or census block FIPS (whichever available) as address locator zone.
    - Geocoded point features converted to street segment geometry via spatial join using "contains" criteria, keeping matched records only.
- For datasets submitted as shapefiles: VB If/Then statements used to calculate "Max" and "Min" address range attributes required by the NTIA/FCC, converted from the FromRight, ToRight, FromLeft, ToLeft format used by most standard street segment reference files and incoming datasets:

- **To calculate “Min”:**

```
Dim fromRight
Dim toRight
Dim fromLeft
Dim toLeft

fromRight = [FROMRIGHT]
toRight = [TORIGHT]
fromLeft = [FROMLEFT]
toLeft = [TOLEFT]


Dim minright
If fromRight = 0 And toRight = 0 Then
   minright = 0
ElseIf fromRight = 0 Then
  minright = toRight
ElseIf toRight = 0 Then
  minright = fromRight
Else
  If fromRight < toRight Then
    minright = fromRight
  Else
    minright = toRight
  End If
End If

Dim minleft
If fromLeft = 0 And toLeft = 0 Then
   minleft = 0
ElseIf fromLeft = 0 Then
  minleft = toLeft
ElseIf toLeft = 0 Then
  minleft = fromLeft
Else
  If fromLeft < toLeft Then
    minleft = fromLeft
  Else
    minleft = toLeft
  End If
End If
```

- **To calculate “Max”:**

```
Dim fromRight
Dim toRight
Dim fromLeft
Dim toLeft
```

```
fromRight = [FROMRIGHT]
toRight = [TORIGHT]
fromLeft = [FROMLEFT]
toLeft = [TOLEFT]


Dim maxright
If fromRight > toRight Then
  maxright = fromRight
Else
  maxright = toRight
End If

Dim maxleft
If fromLeft > toLeft Then
  maxleft = fromLeft
Else
  maxleft = toLeft
End If

Dim max
If maxleft > maxright Then
  max = CStr(maxleft)
Else
  max = CStr(maxright)
End If
```

Creating last mile and middle mile features

- Formatted numeric fields in Excel as text since the short integer format in the data model for these fields will not accept values from the Excel import's default general format.
- ArcToolbox > Data Management Tools > Layers and Table Views > Create XY Event Layer
- Zoom to Layer, verifying that all points are located inside NC boundaries

Provider-specific notes, functions and corrections performed by NC Broadband as needed

Access/On Multimedia Inc. S13

- This is a middle mile only provider
- Provider confirmed no changes since last round so fall data was used

Cape Lookout Internet Services S13

- Duplicated Centurylink footprint (CB and street), to represent their reseller status.

AT&T S13

- Converted subscriber weighted nom speed data from CBSA to county
- Calculated conversion of Left and Right To/From addresses for street segment data to NTIA's required Max/Min values (using "min" and "max" formulas in Excel)

- Checked data by CB for duplicates, none found.
- Geocoded street-level data using 2010 TLID field.
- Selected counties from mapped subscriber weighted nominal speed data that actually contain broadband availability data by census block or street segment. Exported selection as Overview file.
- Linked geocoded points representing street segment data to polyline street segments via one-to-many spatial join, using intersect criteria with a 2 foot search radius. Eliminated extraneous joins by selecting out records in the results where target and joined TLID fields did not match.
- Many exact duplicates. After eliminating exact duplicates, many streets were reported with multiple speeds. Consolidated and took the highest speed available.

ATMC S13

- Merged shapefiles of address level data from two counties served, renaming and consolidating attribute fields.
- Added Address field populated with a concatenation formula of component address information.
- Added EndUserCat field and populated with code 5
- Overlay of address points w/CB layer to get FIPS code field
- Created new fields and used Calculate Geometry function in ArcMap to generate Lat and Long attributes

ATMC Wireless S13

- Clipped shapefile to Tiger 2010 state boundary
- Eliminated polygon parts less than 0.125 square miles
- Ran simplify polygon to remove extraneous points, set to 20 feet max offset.
- Added spectrum attribute

BalsamWest S13

- Added FRN from FCC search tool online

CenturyLink S13

- Reprojected CB and street shapefiles and changed format of some fields for loading (created new fields of compatible type for TransTech, EndUserCat, and Provider_Type fields)
- Used If/Then scripts to calculate min and max address fields from left and right max/min ranges in ArcMap field calculator
- Noted partial CB geometry delineated (ie boundaries indicating where only parts of some CB's are served around the served area perimeter), but with correct 2010 census block FIPS codes, as confirmed by a test geocode.
- Removed 10,257 duplicate street segments, and 1,151 duplicate census blocks

Charter S13

- Re-projected and formatted attribute fields. Added Provider Type of 1 and EndUserCat field with value 5 for "Other/Unknown"
- Streets submitted and mapped in 2010 Tigerline, with no address range information. No unique identifier in common with reference Tigerline file, so no resulting address range info.

- Checked for duplicates in CB shapefile using Delete Identical, none found. Removed 66 duplicates from street shapefile.
- exclusion of a small area of street segments and census blocks along the southern border of Cleveland County which was found to be bleedover from availability data in SC.

Comcast S13

- Mapped CB's submitted this round
- Calculated min/max address ranges for street segment data in Excel
- Manually cleaned up street data text.
- Geocoded hypothetical midpoint of tabular street segments by address range, using composite street geolocator with zero offset.
- Spatially joined the above geocoding results to TIGER 2010 street segment features (using Intersect criteria with search range of 5 feet). Ran Delete Identical tool on the resulting street segments based on unique shape, TLID, and TransTech.
- Mapped Overview data as submitted in Fall 2010
- Clipped all mapped data to Caswell county, as directed by Comcast point of contact
- Created ArcGIS Explorer map for provider to review and feedback on data quality issues

Cricket S13

- put the shp in the appropriate format and dissolved correctly.
- add the padded zero's to the FRN so that there are 10 digits.
- Missing typical speeds, copied from advertised.
- reduced the number of vertices to a reasonable number (was under limit, but still excessive at 100k +)
- removed polygon islands and donuts smaller than 0.125 square mile

Country Cablevision and Carolina Mountain Cablevision S13

- Formatted fields of new address data
- Removed 178 duplicates from Carolina Mountain Cable, 299 from Country Cable, existing due to exclusion of unit/apt numbers
- Geocoded addresses and designated those in Haywood County as those served by Carolina Mountain Cablevision
- Created overview table based on information sent from provider in a follow up email.

Electronics Service Co of Hamlet

- Customized propagation model for unique antenna setup high up in trees
- Clipped output to state boundary
- Populated last mile Ownership field with '0' for owned, but still need confirmation from provider

Ellerbe Telephone Company S13

- 3 FIPS codes were unrecognized, 371239605003094, 371239605003068, 37153970200314
- 2 duplicates were removed

- 25 of the CBs should have been reported at the street level
- Overview – Montgomery County missing; does not cover all the census blocks that were provided (also had this problem in last submission)

Frontier S13

- Mapped (created XY event layer then export to shapefile) additions to DSLAMS since fall as last mile connection points. Loaded into geodatabase in addition to previously reported last mile points.
- Applied a 15,000 foot service circle to last mile points for availability (no dissolve), then a 8700 foot and 6000 radius to a subset of points as per the provider
- Applied speed codes reported by provider to be the max available within each radius.
- Created subset of 2010 road segments that intersect each set of radius buffers, via spatial join using intersect criteria. Merge rule set to max for all four speed fields in order to capture the appropriate radius that applies to any given street segment.
- Added fields for EndUserCat and ProviderType, populated all records with 5 and 1, respectively.

- Saw that previous service area polygons still represent the best approximation of coverage over this new set of addresses plus previously submitted addresses, so transferred previous polygon created in the following way:
    - identified clusters of these address points, then used subsets of the point locations to derive Minimum Bounding Polygons (Convex Hulls) representing available wireless coverage.
- One-to-one spatial join associating provider attributes and speeds with minimum bounding polygons.
- Added spectrum field and populated with code 6.

Inteliport S13

- Provider is working on but has not yet been able to compile equipment specs that would allow us to run a propagation model, so in the meantime, polygons were created from census block locations.
- Follow up from provider in March 2012 clarified the max advertised speed values, based on service tiers and throttling used to keep streaming media from overloading the bandwidth when many users are subscribing to a given microcell. These were reduced from the maximum bandwidth capacity values included previously.
- Census block shapes used in the wireless feature class were merged into a single, multipart polygon based on their identical attributes.

MCNC S13

- Used new output data sets from MCNC for Address and MidMile data
- Changed provider type value to 3 for “Other”. Updated all the EndUserCat codes to 2, since MCNC serves middle mile directly to institutional end users only.
-
- Geocoded addresses that did not already contain a lat/long.

Filled in missing ZIP code values based on address

Mediacom S13

- Freshly geocoded entire address data set, transferred new transtech codes and speeds.
- Coded for EndUserCat based on a text field in data from provider

- MI-Connection S13Used previously reported addresses, but increased max speeds per the provider. Changed all records with Transtech 41 to 40, reflecting the network upgrade to DOCSIS 3.0 across the entire cable footprint.
- Updated middle mile attributes and created new corresponding last mile point.
- Applied new subscriber-weighted speed per the provider (not broken down by county)

Morris S13

- Several building numbers missing. If the street is a local road, then the point is put close to where it hits a main road. If it is a long arterial road, then it was left unmatched
- Many of the auto unmatched were due to zip code problems. It was too labor intensive to find each instance, however roads with 3 or more addresses that were entirely unmatched were chosen as the low hanging fruit that would yield the greatest gain. In these cases, it was verified via Google maps that the road was very close to the zip given by Morris, so we could be relatively sure changing the zip was the correct action. This had to be done manually, as there is no way to tell the address locator to pick an adjacent zip if it can't find that one. If you open it up to another zip, then you open it up to any zip. This making the address location less stringent would have had the addresses popping up all over the state.
- Missing some zips (Cullowhee) and city names. Filled in based on either Google maps or neighboring addresses in Morris data.
- Removed 16 duplicates
- 2789 / 56046 unmatched = 95% matched

NC Wireless S13

Spring 2012 data used, which was processed in the following way:

- Wireless propagation of data, this time using a higher minimum signal strength threshold of -80 dBm.
- Follow up helped correct the max advertised and typical speeds of one tower footprint within more practical values based on channel availability.

North State S13

- Corrections for missing FIPS digit and inserted leading zeros for tracts.
- Speeds were reported as Typical Up/Down only. Substituted these values into Max Ad Up/Down as well.
- Ran script to update existing and geocode new address records reporting broadband coverage.
- Middle Mile, Last Mile: Added negative sign to longitude values

PANGAEA S13

- Corrected FRN code with follow up from the provider
- Categorized last mile points as Owned by the provider
- Removed one last mile location that is in South Carolina (Saluda Library).

Pineville Telephone Company S13

- Removed FRN in census block feature class, to prevent conflict with "speed tier" duplicates check in NTIA script. This is a workaround because script is not set up to handle multiple DBA names used by the same parent company with the same FRN.

Randolph TMC and Randolph Telephone Company S13

- Formatted text information and consolidated into one Excel file
- Streets method:
    - Calculated the difference between the min and max addresses, and how many blocks of 100 that encompassed.
    - Use the min address for all with 1 block or less
    - Using Excel, created one address for every 100 block when the range was 550 or less.
    - Created six addresses evenly distributed across the range, when the range was 551 or more.
    - Geocoded all of these false addresses, fixing typos as appropriate.
    - The leftover unmatched were filtered for those which had no matches at all for that street. Ancillary data sources were used to make every effort to get that street segment included in the data.
    - Once all the points were on the map that could be located, did a spatial join (closest) to the TIGER data.
    - Removed duplicate points where the transtech and TLID were identical (speed was not an issue, as each transtech had the same speed codes respectively)
    - The product was a data table with all the provider fields filled in, that also had a TLID attached.
    - New streets data table geocoded to TIGER as normal for streets data.

Star Telephone Membership Corporation S13

- Identified a formatting issue with zeroes in the tract number section and corrected this.
- Identified a remaining 78 census block records that did not find a match, and were found to be vintage 2000 census block FIPS codes. Converted these records to year 2010 geometry, and combined with blocks reported as 2010 geometry, then removed some resulting duplicates.
- Corrected one last mile connection point with a formatting issue on lat/long that was creating an inconsistent extent when mapped.
- Used field calculator to make the contents of Provider Name and DBAName fields consistent and spelled out in every feature class rather than sometimes abbreviating Corporation to Corp.
- Corrected FRN to have sufficient number of digits/leading zeroes.
- Added lat/long coordinates to middle mile point reported, based on communication that Star TMC, Starvision, and Interstar all share this connection point.

Starvision S13

- Parsed street information in address data
- Mapped using lat/longs supplied by provider.
- Corrected latitude coordinates that seem to have been typos in the original file (one degree +/- the location described by the address)

Skybest and Skyline S13

- Created missing .prj file for shapefile exports from provider, based on follow up determining an NAD 83 North Carolina FIPS 3200 ft projection.
- Converted polylines to polygon for each DSL and fiber-to-the-home technology layers.
- Created fields and attributed manually from contents of provider-supplied .mdb files.
- Spatial join with Tigerline 2010 streets WGS84 by location inside newly created polygons (using streets was found to be more accurate, with less overstatement, than an overlay with census blocks).
- Manual touch up, deletion of streets that only touch the boundary of served polygons.
- Used VB script in Field Calculator to derive max/min address range information

SkyeNet Wireless Communications S13

- Provider does not participate in data collection. Information was gleaned from the provider's website in previous data collections, by selecting and merging the relevant census blocks corresponding to served areas indicated on the provider's online map. This footprint was checked for currency using the company website on 3/21/2013.
- Unlicensed spectrum is assumed and no match could be found on the FCC FRN system.
- Maximum speeds were obtained from the FAQ page of the same website. Typical speeds were inferred by information also on the FAQ page, with speed codes most closely matching the ranges described. Speeds were updated after checking the website again on 3/21/2013.

Skyrunner S13

Fall 2012 data was used, which was processed in this way:

- Corrected footprint using most current wireless equipement specs and -80 dbm (previous signal threshold change had been done on older data by mistake).
- Added Sky Catcher data to the footprint to reflect the recent acquisition of their network.
- Last Mile: assumed Ownership by Skyrunner in the Ownership field, wireless type for backhaul, and capacity codes equivalent to max advertised speed of the surrounding wireless footprint.

Star TMC S13

- Corrected zero misplacement in tract numbers and 15-digit CB FIPS codes (double zeros should be at the end, rather than beginning of tract numbers)
- SomeCB's found to be reported in year 2000 vintage. Converted those to year 2010 using methods similar to those described in Fall 2011:
    - Select all records in Spring 2011 provider dataset
    - Relate FIPS 2000 field in provider data to FIPS 2000 field in statewide crosswalk table
    - Relate FIPS 2010 field in statewide crosswalk table to GEOID field in 2010 census block layer.
    - Export related/selected 2010 CB records as new layer, and related/selected crosswalk records as a provider-specific dBase table.
    - Join Field on exported Crosswalk subset with Spring 2011 provider data layer based on year 2000 CB number.
    - Join Field on new 2010 CB layer with the joined crosswalk DBF (which should now have the relevant provider data) based on 2010 FIPS field.

Suddenlink S13

- Removed records without speed codes, as per the provider these indicate blocks and street segments without Suddenlink broadband service.
- duplicates removed from address data.
- Mapped new address data as well those previously reported, (attempting to follow up with provider to find out if they have made corrections, reduced service, or are reporting current subscribers only).
- Confirmed with provider that all of the network is DOCSIS 3.0 capacity, but that they have not yet increased their advertised speeds, they have determined that their market does not currently support it

Surry TMC and Piedmont Communications S13

- Added zeroes to FRN for 10-digit format.
- Created hypothetical addresses in increments of 100 from within the address ranges supplied in Excel format: one street number being the integer midpoint, one being the min value plus 50, the next being 100 higher than that, etc. up to the max value minus 50 (except for a few address ranges that were very broad, with min and max difference of 1400 or more).
- Spatially joined the geocoded points to polyline street segments using intersect criteria and a search radius of 5 feet, one-to-many, then dissolve to remove duplicates). Used max of speeds as statistics fields.
- Used Tigerline address ranges for the min and max address ranges in street attribution. Used parsed street name attribution from Surry/Piedmont data.
- Removed CBs where streets were given (they were double reported)

TDS Telecom S13

- Data submitted as geodatabase feature classes, availability at address level. Addresses and mid-mile points spatially joined with 2010 census blocks to derive complete/correct FIPS codes.
- Removed 36 addresses that were unmatched by geocode in data received.
- Duplicated max advertised speed codes in typical speed fields
- Removed one address per provider upon review of finalized and mapped data.

Time Warner Cable S13

- CB and Streets:
    - Reprojected into WGS 1984
    - Added Provider Type field and coded as a “1”
    - Added EndUserCat field and coded as “5”Input Max Advertised speeds as Typical Speeds as well, since they were not included.
- Streets: no min or max address ranges of any kind were included in the data, so a spatial join with Tiger 2010 street centerlines was done to attach address ranges based on “center contained in” criteria.
- 3127 duplicates removed from street centerlines (based on identical shape and address range attributes)
- Mapped overview data from Fall 2012, edited the provider information to match that which was reported in census block and street data for the same service.

- Mapped middle mile data, which contained nationwide connection facilities TWC chose to include as middle mile, and none of these fall within North Carolina's boundaries, so none was added to the transfer geodatabase.

T-Mobile S13

- Reprojected shapefiles into WGS 1984.
- Added field to categorize by technology type/T-mobile service tier (3G, 4G).
- Attributed manually from information sent in a text file from T-Mobile.
- Eliminate Polygon part tool to remove features <0.125 square mile.

Tri-County S13

- Separated addresses reported by technology type
- Nine duplicate records removed from DSL addresses
- Concatenated DSL address information into single Address field in BackEnd template spreadsheet.
- Addresses for wireless subscribers mapped using existing lat/longs and minimum bounding polygons created
- Addresses for DSL availability that did not have lat/long fields populated were geocoded
- Addresses with lat/longs submitted and geocoded addresses merged together, then aggregated to corresponding census blocks, using spatial joins with max merge rule for speed fields.
- Selected census blocks from spatial join that are >2 square miles, selected Tiger 2010 street segments that are within those blocks, then used those selected streets for a spatial join with addresses reported for DSL, using max merge rule for speed fields and a 500-foot search radius.
- Used script to calculate absolute min and max addresses for the final selection of street segments.
- Excluded census blocks >2 square miles from census block data.
- For Tech Type 10: Selected and exported resulting aggregated CB data for CB's <2 mi. These were loaded into the geodatabase with associated broadband data.

Verizon Wireless S13

- Merged "evdo" and "lte" transmission type files into one with field distinguishing the two.
- Simplify wireless polygon to remove extraneous vertices, max offset 150 ft.
- Eliminate polygon parts less than 0.125 square miles
- Applied attributes according to accompanying word document from provider.

Wilkes S13

- Contacted provider and verified a correction to make where nine census block records have fiber to the end user available, and the max download speed code was reported as 4. The values were changed to 7 to match the other fiber records, as confirmed by the provider.

Windstream S13

- Windstream submitted census blocks for which speeds only were to be updated.
- Same census blocks and street segments as originally submitted in previous data collection were used, but speeds from new data were used based on spatial join between geocoded census block centroids with updated speed codes and actual census block polygons from previous data collections.

- Only 7 census blocks with new speeds fell within Lexcom coverage area, and no updated speed records specified that company name, so Lexcom speeds were left the same. Provider did not respond to three inquiries seeking confirmation on this matter.

Yadtel S13

- Structures = available, rest of submission = subscribers
- Consolidated into one dataset of copper and fiber using the address. Where structures had both copper and fiber indicated, there are two entries with the respective transtechs. (NOTE: there were issues with the addresses in the structures, where the incorrect city/zip was given. We determined that the county column was correct even if the city/zip was wrong. For example, the addresses for 100 and 102 Main St would say Union Grove, Iredell Co. The address for 101 Main St would say Mocksville, Iredell Co. Meanwhile, in the subscriber data, it would have 100-102 Main Street all in Union Grove, Iredell Co. Therefore combining the street info with the county was the way duplicates between the 2 datasets were recognized and removed.)
- If the address was in the subscriber data, the Yadkin-provided coords were used.
- If the address was in the structures data only, then it was geocoded by CGIS.
- EndUserCat based on structures file. If Occupant is not null, then 2, otherwise 5. If address did not appear in structures (as was the case for much of the copper), then EndUserCat = 5
- Copied typical speeds from advertised speeds

Providers for which typical speed information was not supplied to NC Broadband:

- Barnardsville Telephone Company (FRN: 0003766714)
- Clearwire (FRN: 0017775628)
- Comcast
- Frontier Communications of the Carolinas, Inc. (FRN: 0018802660)
- Greenlight/City of Wilson (FRN: 0015950934)
- Lexcom (FRN unknown)
- Saluda Mountain Telephone Company (FRN: 0003767662)
- Service Telephone Company (FRN: 0003767712)
- Time Warner Cable (FRN: 0013430244)
- ViaSat Communications (FRN: 0007843766)
- Windstream Concord Telephone (FRN: 0003762010)
- Winstream North Carolina (FRN: 0004967634)

For these providers listed, the coded values for maximum advertised speeds were duplicated in the typical speed fields, since the placeholder code “ZZ” to indicate missing information is no longer accepted in the data model. When typical speed information is not supplied by the provider, a comprehensive and accurate substitute is not available, particularly since speed test data does not necessarily reflect the throughputs of the highest speed tier available.

Post-processing Functions for Final Integration

Census Block

After Census Block data was loaded into the transfer geodatabase feature class, FIPS code fields were calculated using commands in the Field Calculator and contents of the FullFIPSID field. The following calculation formulas were used:

STATE FIPS = Left ([FULLFIPSID],2)
COUNTYFIPS = Mid([FULLFIPSID],3,3)
TRACT = Mid([FULLFIPSID],6,6)
BLOCKID = Right ([FULLFIPSID],4)

- Duplicate records were identified using the ArcToolbox Frequency tool and various field combinations. Duplicates were resolved by editing Pineville Telephone Company's FRN field to avoid confusion (this provider uses the same FRN for two DBA's).
- Warnings on speed values were identified and either edited or explained after follow up with the provider and/or further investigation.
- Ran repair geometry tool 2x and confirmed that no features were deleted.

Road Segment Data

- Warnings on speed values were identified and either edited or explained after follow up with the provider and/or further investigation.
- Ran repair geometry tool and confirmed that no features were deleted.

Address Data

- Warnings on speed values were identified and either edited or explained after follow up with the provider and/or further investigation.
- Ran Repair Geometry tool and 14,443 features that could not be accurately geocoded were removed for null geometry.
- Manually corrected some missing ZIP codes (populated by looking the addresses up online), and a few null street name values.

Wireless

- Duplication of multipart coverage polygons to reflect multiple spectrum ranges used, per NTIA/FCC instruction.
- Warnings on speed values were identified and either edited or explained after follow up with the provider and/or further investigation.
- Ran Repair Geometry tool 2x and confirmed that no features were deleted.

Overview

- Field Calculated "Geographic Unit Type" field to CO, and "StateAbbr" field to NC.
- Deleted records of information for wireless technology types.

- Verified that all FRN's were either 9999 or 10 digits with leading zeroes.
- Ran Repair Geometry tool 2x and confirmed that no features were deleted.

Last Mile

- Field Calculated "Ownership" field to -9999 for records null in this field. Calculated "StateAbbr" field to NC.
- Ran Repair Geometry tool and confirmed that no features were deleted.

Middle Mile

- Spatial join with census block layer to derive the 15-digit FIPS code, then reload features into middle mile feature class including the new values for populating the "FullFIPSID" field.
- Replaced Null Elevation values with -9999 "default" value using Field Calculator.
- Populated State Abbreviation column with "NC".

CAI

- Loaded existing CAI's as present in Fall 2012 data submission.
- Added senior centers (156) from recent data gathering efforts.
    - Categorized as "community support – governmental" but may need to change some later to nongovernmental based on nonprofit status or other incorporation as private entities.

Verification Implemented Prior to Spring Data Submission

Data verification methods implemented by NC Broadband in time for submission at the federal level followed generally along the lines of quality control. Methods most often used are outlined below. Time constraints on existing staff did not allow for the execution of some more complex verification approaches that are in the planning/setup stages, but verification involving multiple data sources is in use and will continue to develop as part of NC Broadband's ongoing work.

Standardizing

The files from datasets received from each provider, except for those few submitted in shapefile format, were manually transferred to a back end Excel-format template with field headers, to create a single-file, standardized field structure for each provider's data that could be used for quick reference and map feature creation. This step also helped staff to ensure that all required components were either present or requested in follow up to the provider, and that the components were reported in the correct format.

Lat/long coordinates

Some information was submitted to NC Broadband with lat/long coordinates included for the location of point features. This location information was checked during the mapping process, and values were corrected if the provider had made mistakes such as reversing the latitude with the longitude, or forgetting to include the negative sign for the longitude value. In addition, NC Broadband followed up with providers on point features that showed up in the map outside the state and/or outside the provider's reasonably expected service area. Point features that mapped outside the state after follow up with providers, including those that mapped to zero degrees latitude and longitude due to an unknown location, were deleted from the geodatabase for submission at the federal level. For fixed

wireless data generated by propagation model from antenna specs, the latitude/longitude coordinates of the antenna locations reported by the provider to NC Broadband were verified by NC Broadband's university GIS research contractor using high-resolution orthoimagery.

Multiple FRNs

In several instances, providers reported multiple FRN's that increased in numerical increments of one for each record of data, and this was found to be a simple error when the providers were trying to paste their organization information down the rows applying to a list of broadband data records. This was checked for and corrected after confirming that the lowest/first reported FRN was the correct one.

Correct technology type codes

Knowledge from our technical staff and online research was sometimes used to supplement data that NC Broadband had relevant to a provider that was unresponsive or otherwise did not supply this specific piece of the information. For example, a provider may have gaps in their transmission technology field and these were filled in when technical staff could confirm that the provider operates with only a single technology type. Or the staff may know which technology type is used by a provider who left this field blank on all records.

Subscriber-weighted nominal speeds

Weighted nominal speed values were checked, and staff followed up with the provider if all values were the same for multiple counties, as this could result from either a single speed tier for a given transmission technology across counties, or in some cases providers were not following the formula provided and had manually entered the same value regardless of differences in subscriber numbers. When these cases were discovered, technical assistance was offered and a new subscriber-weighted nominal speed dataset created to reflect variation between counties.

Wireless model fieldwork

For fixed wireless provider data that was generated as coverage area output from models based on technology and environmental factors, the data was verified by "ground-truthing" with measurements of signal strengths at sample locations within a provider's service area, observation of the influential ground conditions in each location, and comparison to the expected signal strengths at the same locations in the model. Some calibration of the model was then performed so that the resulting polygons could more accurately reflect what would be found in real life.

Check Geometry

After compiling all datasets into the geodatabase feature classes, the check geometry process in Arc Toolbox's Data Management section was used on each feature class to identify and repair any geometry errors in the features.

Comparisons with Citizen-Sourced Data

NC Broadband maintains a mapped database of input from citizens who report having no access to broadband at their location from any broadband provider (or possibly just mobile or satellite options that don't meet the user's needs or budget from their perspective). Input is collected throughout the year directly from local citizen advocates, from NC Broadband's website feedback form, and from locally conducted surveys. Comparison of provider-sourced data with this information allows for targeted follow up with providers in order to promote access to broadband for these citizens, as well as to pursue

refinement of our statewide broadband data. FCC deadzone and speed test data is also being retrieved and processed for inclusion in data comparison.

North Carolina has a new opportunity to compile a large volume of citizen-sourced data that can be used for verification purposes through the READY Anywhere! program currently under development. This goal of this program, led by the North Carolina Department of Public Instruction (DPI) is to identify solutions to ensure broadband access for students after school hours. . As a key partner in this project, NC Broadband will work with local school districts across the state to collect availability and demand information on broadband access at home for k-12 school children. The process is still under development, but the surveys will likely be distributed through schools, completed by parents, and coded via Scantron machines available at each Local Education Agency (LEA) office, then brought into the mapping environment by NC Broadband. Mapped survey results would then be used for data comparisons and verification, shared with providers that serve the areas, and discussed in locally-based broadband planning teams with technical assistance staff provided by NC Broadband. NC Broadband and DPI hope to have pilots with several LEAs underway in the next couple of months, with a larger roll-out scheduled for the start of the school year in August. We believe this data source has the potential to be large enough to more clearly point out areas where provider data may need to be adjusted for accuracy. Further data collection from citizen input and comparative analysis approaches will be described as more conclusive information develops.

North Dakota Broadband Mapping Methodology Report

Submitted To:

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March 22, 2013

Contents

Executive Summary

The following report describes methods and issues related to the April 1, 2013 deliverables to NTIA for Broadband Mapping in North Dakota. This data submission is compliant with all guidance and specifications provided by NTIA. As per NTIA guidance we are using current versions of the Broadband data model and the validation script.

North Dakota has developed a robust operational data model, components of which are described in this report, to support our broadband mapping efforts. We feel our operational model can support any reasonable modifications to NTIA requirements. Since this deliverable format is derived from our operational data model, we anticipate some modifications will be required. We are able to take best practices recommendations from the NTIA and incorporate those into the final deliverable without major modifications of our work flow and operating rules.

Our mapping process started with infrastructure points (central offices, remote terminals, wireless towers and antenna locations, middle mile and backhaul), cable franchise areas, and anchor institution addresses. Those served an important role, especially with providers who have not actively participated in coverage mapping and those supplying broadband coverage for large generalized areas and larger geographic census units such as census tracts. When providers have not supplied detailed information of their service areas that can be mapped at the census block level, coverage models were derived dynamically from this infrastructure based on geoprocessing techniques specific to each broadband technology. Examples of geoprocessing techniques include using infrastructure points in conjunction with the road network to predict the area served for DSL coverage. For all providers of wired broadband services, those have all been completed and remain static unless a provider chooses to participate with more detailed coverage mapping at a level of geography at or smaller than a census block.

The North Dakota Broadband Mapping Project, within the State's Information Technology Services Division, collaborated with Tetra Tech, Inc., to develop a web-based application for creating and maintaining broadband availability data. The Broadband Editing Tool design lets non-technical staff update both spatial and attribute data through a web interface. The Broadband Editing Tool's functionality gives broadband providers fine-grained control over how their service areas are represented. The Broadband Editing Tool was used by several providers for the first time in this update cycle. The base map for wired broadband coverages within the editing tool is composed of a structured grid of polygons composed of census blocks less than 2 square miles in size and one kilometer square polygons for areas within census blocks larger than 2 square miles. The editing tool allows providers to view their coverage from the previous submission and interactively select structured grid polygons, or to upload a coverage created in

an external program such as ArcGIS or AutoCAD and use that coverage to select polygons from the structured grid. Selected structured grid polygons can be added or deleted from the coverage in the previous submission for each unique provider/technology of transmission/speed tier. Wireless coverage, fixed or mobile, are uploaded to the Broadband Editing Tool as coverages and maintained as coverages in the editing application. After a review by the state and their contractors an automated script exported the broadband coverage from the Broadband Editing Tool in NTIA format.

We developed a system to quantify "validated" data for the purpose of determining what was suitable for delivery to NTIA. The operational data model maintained reliability and validity codes. As more data is obtained from providers in maintenance updates, the validity and reliability of infrastructure points has diminished, though they remain the only basis we have for non-participating broadband providers.

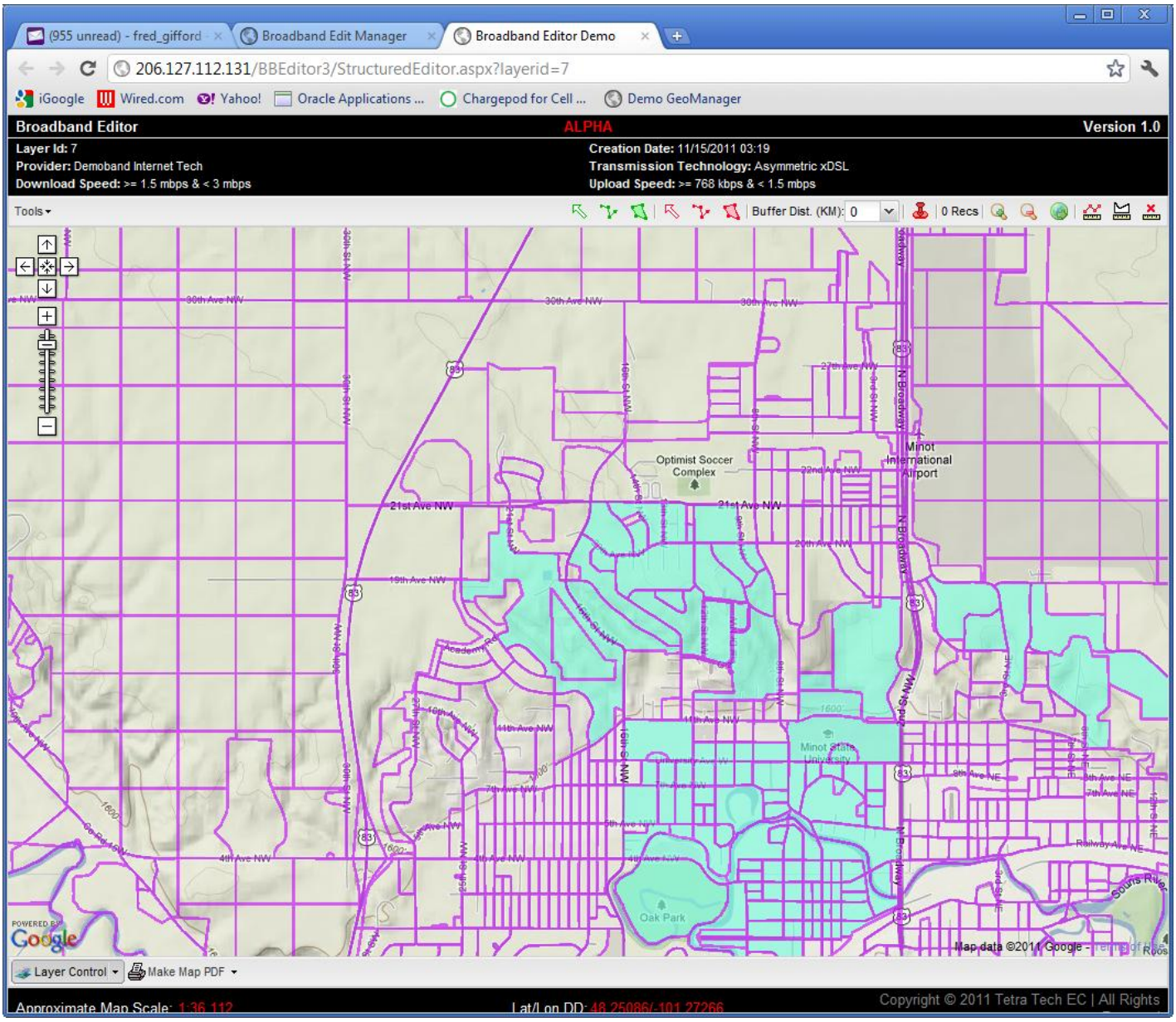
Provider Summary

Through extensive research we identified a master list of 173 potential providers in North Dakota with 50 companies identified as actual broadband providers. The North Dakota Broadband map includes 48 broadband providers. The full list of the potential providers researched but subsequently identified as not providing broadband service is included in Appendix A.

Web Based Editing Application

The State of North Dakota Broadband Project has developed a web-based application for creating and maintaining broadband availability data. The Broadband Editing Tool is designed so that that non-technical staff can easily update both spatial and attribute data through using a simple -to -use web interface (Figure 1). The tool's feature set gives editors fine-grained control over how broadband service areas are represented.

Figure 1. Broadband editing web map interface.



A significant advantage of using an application like the Broadband Editor is that all data updates are completed using structured data entry tools. This means data integrity is enforced during data entry and illegal attribute values cannot be input by the editor.

Editing Tool Components

The editing tool has five main components. A **Structured Editor** for wired broadband service edits, an **Unstructured Editor** for wireless service, a **Point Editor** for Middle-mile and

Community Anchor Institution Edits, a **Management Console** for user and data administration, and an **Export Toolbox** for creating NTIA formatted data.

Structured Data Editor – The structured data editor allows coding of wired (land based) broadband service by census block (census blocks are used due to NTIA mapping requirements). For census blocks that are less than .25 square miles in size the editor is able to select the census block and indicate the type of service provided. For census blocks that are greater than .25 square miles the editor is able to select 500 square meter polygons that are nested within the census block where service is available. This gives users a more accurate depiction of broadband availability on the state broadband map and supports creation of the courser NTIA census block and street segment geography. The results are processed as census blocks and street segments for the national standardized submittal to NTIA.

Unstructured Data Submittal – For wireless coverage areas, which are not based on preexisting geographic features, users submit zipped GIS shapefile polygon layers through the web interface to indicate where service is available. The shapefile is converted into a geodatabase feature class and the user assigns the appropriate service attribute values.

Point Editor – The point editor allows users to add, delete, move, and edit attributes for the middle-mile and community anchor institution feature classes. The point editor uses a simple interface and enforces data integrity validation for all edits.

Management Console – The management console allows for full administration and management of data in the system. The management console is designed around three user roles. Each role has a different level of permissions and capabilities. The roles include:

State Administrator – Full access to all system components, user administration, and editing capabilities.

Provider Administrator – Access to providers' data layers for edit, review and submittal to the State for inclusion in the State Broadband Map.

Provider Editor – Access to providers' data layers for edit.

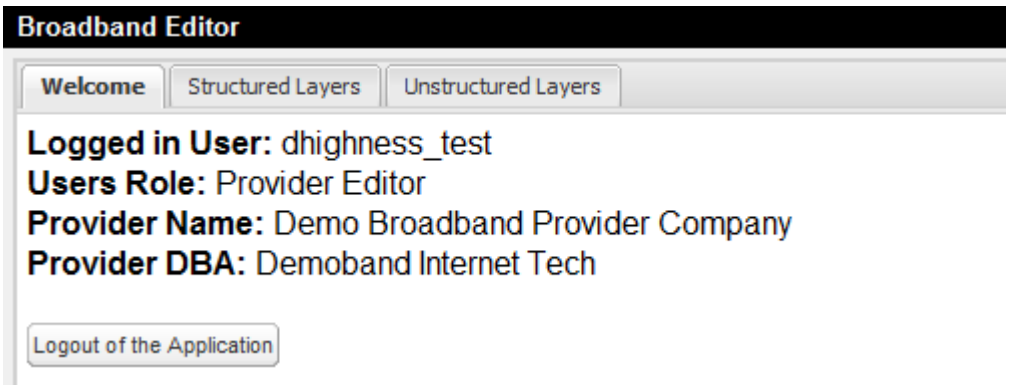
The management console entry screen (Figure 2) shown below includes three tabs –

Welcome Tab – Notes about the project, application revisions and links to help documents.

Structured Layers – Editing and administration tools for broadband coverage based on census blocks.

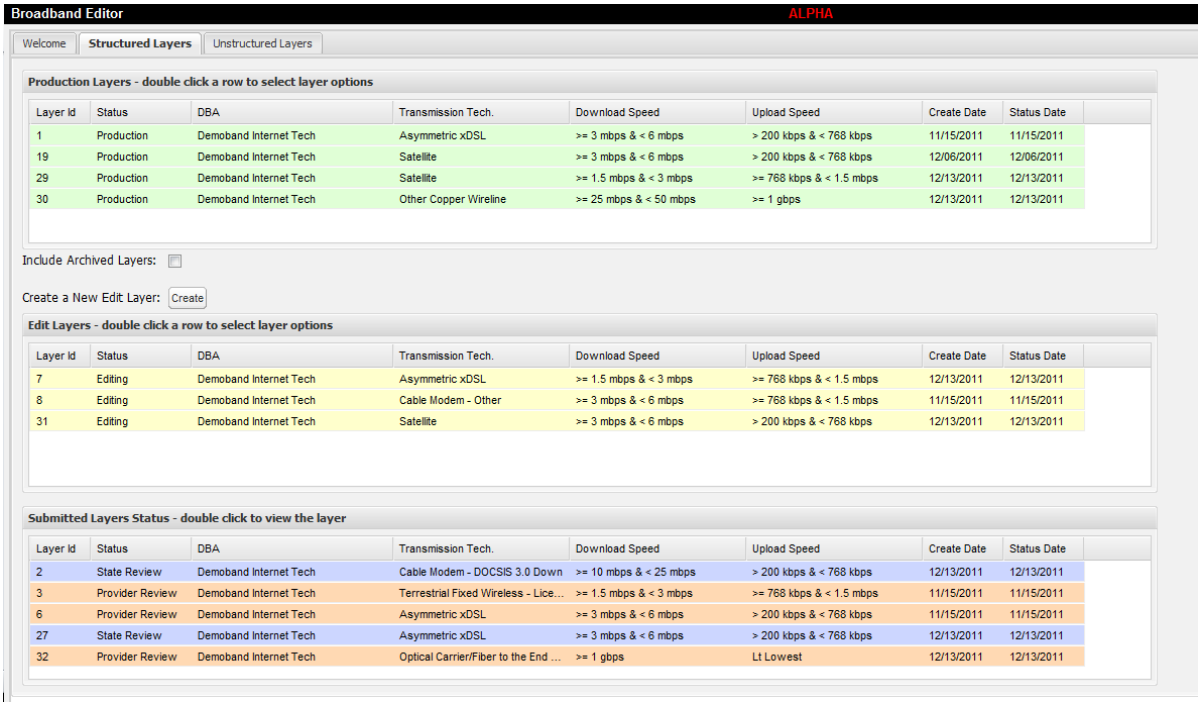
Unstructured Layers – Loading and administration tools for broadband coverage based on GIS shapefiles.

Figure 2. Management Console Entry Screen.



The structured and unstructured management tabs (Figure 3) allow for data management.

Figure 3. Structured and unstructured management tabs.



The data management tabs provides access to all edit and reviewing functionality for all data layers. The full list of layers in the system is only viewable by system administrators. Provider editors and administrators will only see and be able to access their specific data.

There are three lists of layers viewable to the user –

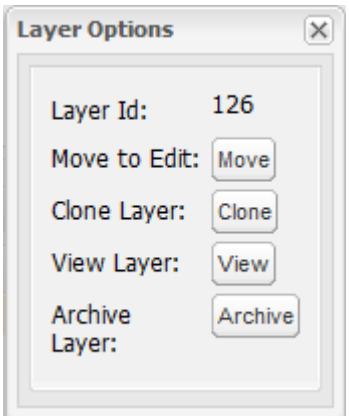
Production Layers – List of the current approved layers for the provider that are currently being reported to NTIA and shown on the State's broadband web map application.

Edit Layers – List of layers currently being edited by the provider.

Submitted Layers – List of layers that are in review by the Provider Administrator or the State Administrator.

Double clicking a row layer in a layer list brings up a context specific menu of options.

Figure 4. Production Layer List Options.



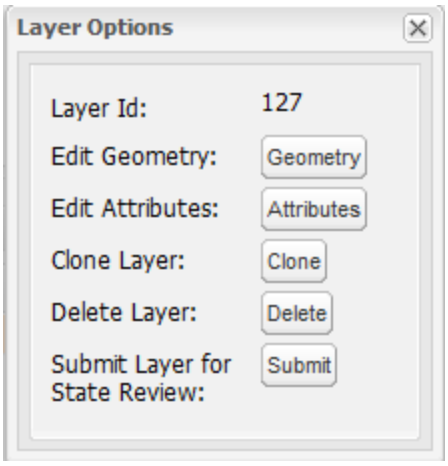
Move to Edit makes the layer available for editing.

Clone Layer makes a copy of the existing layer that can be edited.

View Layer launches the map viewer for a layer.

Archive Layer creates archive of layer and takes it out of production. (State Admin Only)

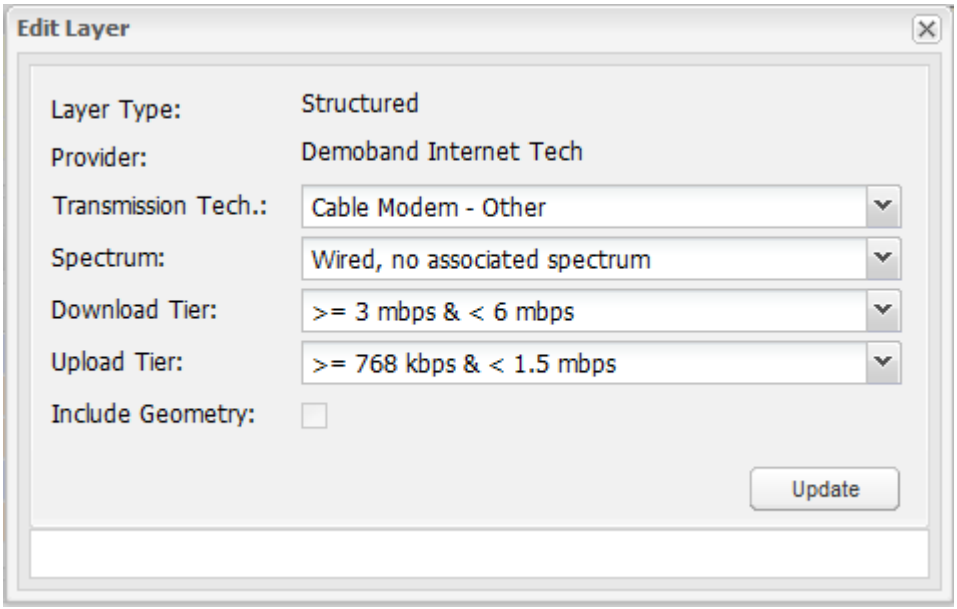
Figure 5. Edit layer list options.



Edit Geometry launches the map editing tool (discussed in next section).

Edit Attributes brings up an editor to allow changes to a layers properties including transmission technology, spectrum and others as shown below –

Figure 6. Edit Attributes Options.



Transmission Tech, Spectrum, Download Tier, Upload Tier are attributes specific to each broadband layer and adhere to NTIA data submittal standard.

Clone Layer makes a copy of the existing layer that can be edited.

Delete Layer completely deletes the current edit version of the layer.

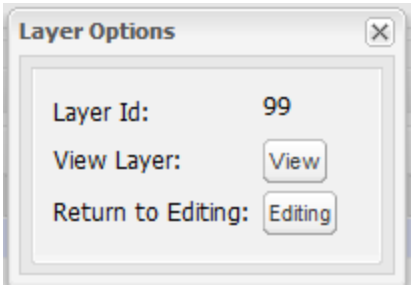
Submit Layer for State Review moves a layer to the Provider Admin list for review. (Provider Admin and State Admin only)

Submitted layer list options –

View Layer launces the map viewer for a layer.

Return to Editing moves a layer to the edit queue so that it may be edited.

Figure 7. Return to Editing screen.



Export Toolbox – The export toolbox is implemented as a set of geoprocessing tools that run within the ArcGIS desktop client. The toolbox includes a collection of tools that convert data created using the editor into the format required for NTIA. In addition the toolbox includes a variety of automated data integrity checks. The purpose for this separation of the editing tools from the data format and conversion tools is to support minor changes to the NTIA data model without having to make changes to the editing application – just the geoprocessing tools.

Data Sources

In the first rounds of broadband mapping, provider presence maps were developed for central office locations and incumbent local exchange carrier locations for all assumed providers in the state. These were identified through a commercial spatial database purchased from GeoTel Inc., and supplemented by other public data sources such as the State's Public Service Commission and DSLReports.com. These were intended to be "talking maps" and general intelligence on where providers have infrastructure for subsequent phone and written communications with providers. These maps were compared to counties served by provider in the state's telecommunications association directory.

Web site research, review of materials submitted to the state by providers, and public websites, such as the FCC were researched for each provider.

New providers are contacted to request data when a significant number of speed tests are recorded, or when we learn of their presence through ancillary sources. Providers that contact us directly and submit data are also included.

Broadband Coverage

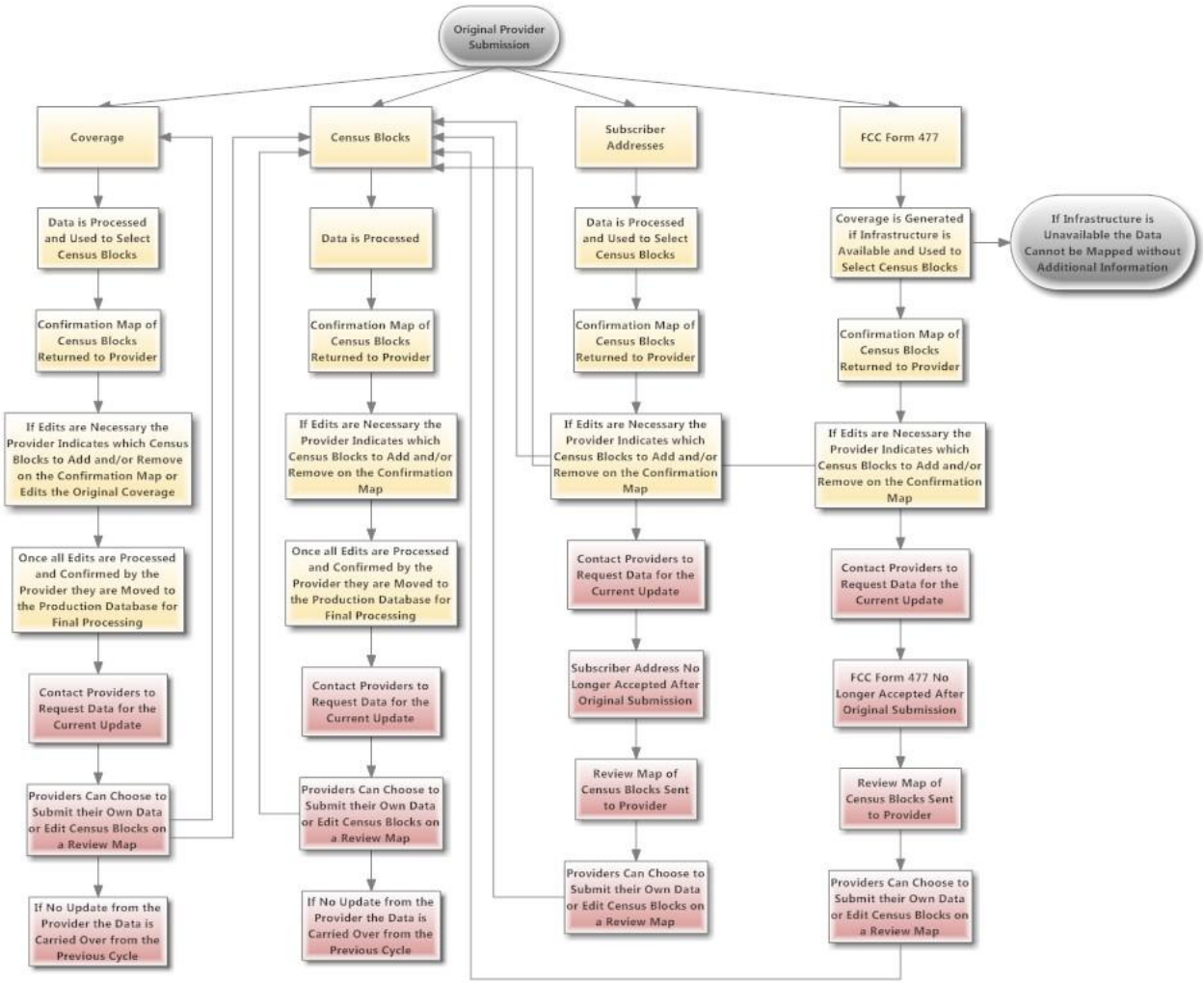
Data submitted by broadband providers was accepted as is and was mapped in complete form when provided as a broadband coverage at the same scale or larger scale than the census block level. Provider coverage submitted at a coarser geographic scale (e.g., census tracts, counties, zipcodes) was supplemented with public data, independent measurements and GIS modeling techniques. When provider submitted data appeared to be exaggerated or providers did not participate in the broadband mapping process, independent measurements and other data sources (e.g., state GIS framework structure locations, speed tests, survey results, website data and infrastructure) were used to override or supplement the provider data.

Broadband providers that chose to submit data did so in a wide variety of formats, levels of completeness, and at varying geographic scales including: narrative descriptions, analog and digital coverage maps, CAD files, GIS shapefiles and geodatabases, KMZ and KML files, FCC 477 reports, and data spreadsheets. All data formats were processed using the web-based application .

If data was submitted by a provider in a format that did not allow mapping at the census block level of geography, providers were sent standardized maps that included census blocks and a data spreadsheet in an attempt to standardize the inputs and increase the geographic granularity of the provider data submission.

Although each provider had individual characteristics and nuances in their data submissions, several data patterns can be described generalizing the provider submissions.

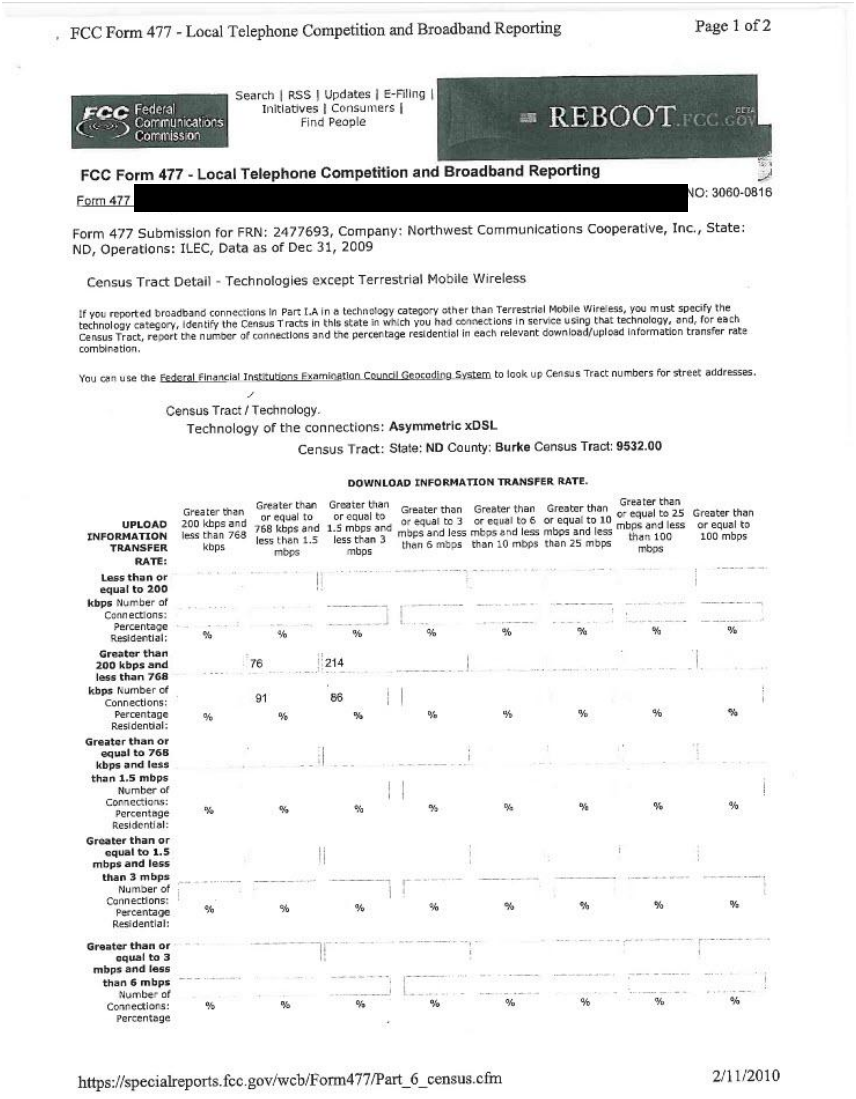
Figure 8 Provider Submission Types and Workflow



Providers Submitting FCC Form 477 Reports or Similar Format

Broadband providers are required to submit FCC Form 477 reports twice a year to the FCC; recently 477 submissions have been done using a structured web site maintained by the FCC. The 477 reports require broadband providers to submit a list of census tracts with the number of subscribers based on maximum advertised downstream and upstream speed tiers. Several providers submitted their actual FCC 477 report or a modified version in analog or digital format.

Figure 9 FCC Form 477 Example



FCC Form 477 - Local Telephone Competition and Broadband Reporting Page 1 of 2

FCC Federal Communications Commission | Search | RSS | Updates | E-Filing | Initiatives | Consumers | Find People | REBOOT.FCC.GOV BETA

FCC Form 477 - Local Telephone Competition and Broadband Reporting

Form 477 [redacted] NO: 3060-0816

Form 477 Submission for FRN: 2477693, Company: Northwest Communications Cooperative, Inc., State: ND, Operations: ILEC, Data as of Dec 31, 2009

Census Tract Detail - Technologies except Terrestrial Mobile Wireless

If you reported broadband connections in Part I.A in a technology category other than Terrestrial Mobile Wireless, you must specify the technology category, identify the Census Tracts in this state in which you had connections in service using that technology, and, for each Census Tract, report the number of connections and the percentage residential in each relevant download/upload information transfer rate combination.

You can use the Federal Financial Institutions Examination Council Geocoding System to look up Census Tract numbers for street addresses.

Census Tract / Technology.

Technology of the connections: **Asymmetric xDSL**

Census Tract: State: **ND** County: **Burke** Census Tract: **9532.00**

DOWNLOAD INFORMATION TRANSFER RATE.

UPLOAD INFORMATION TRANSFER RATE:	Greater than 200 kbps and less than 768 kbps	Greater than or equal to 768 kbps and less than 1.5 mbps	Greater than or equal to 1.5 mbps and less than 3 mbps	Greater than or equal to 3 mbps and less than 6 mbps	Greater than or equal to 6 mbps and less than 10 mbps	Greater than or equal to 10 mbps and less than 25 mbps	Greater than or equal to 25 mbps and less than 100 mbps	Greater than or equal to 100 mbps
Less than or equal to 200 kbps Number of Connections:								
Percentage Residential:	%	%	%	%	%	%	%	%
Greater than 200 kbps and less than 768 kbps Number of Connections:		76	214					
Percentage Residential:	%	91 %	86 %	%	%	%	%	%
Greater than or equal to 768 kbps and less than 1.5 mbps Number of Connections:								
Percentage Residential:	%	%	%	%	%	%	%	%
Greater than or equal to 1.5 mbps and less than 3 mbps Number of Connections:								
Percentage Residential:	%	%	%	%	%	%	%	%
Greater than or equal to 3 mbps and less than 6 mbps Number of Connections:								
Percentage:	%	%	%	%	%	%	%	%

https://specialreports.fcc.gov/wcb/Form477/Part_6_census.cfm 2/11/2010

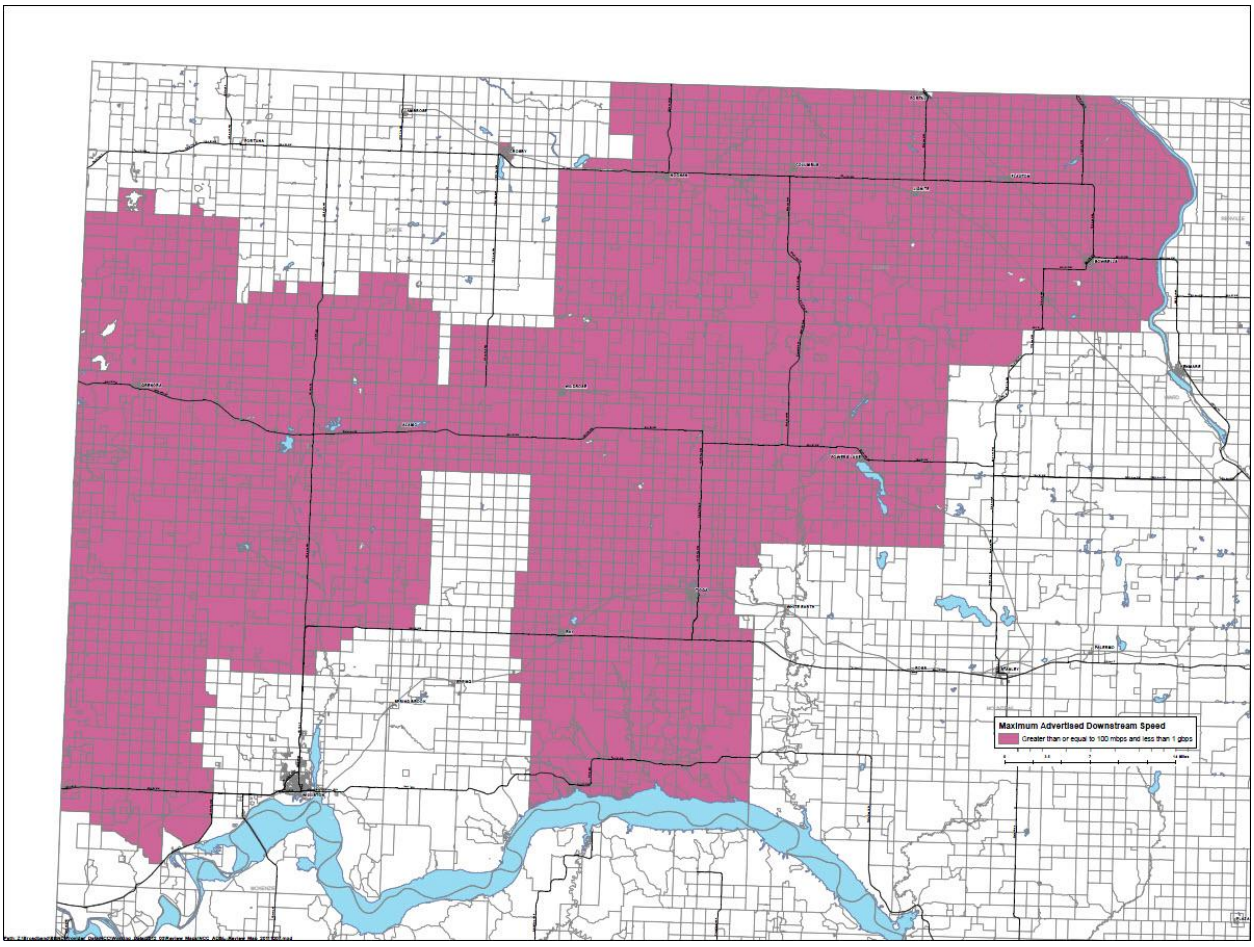
How They Were Handled

FCC Form 477 reports were entered into a standardized format that included the census tract ID code, maximum advertised downstream and upstream speed tier code, and number of subscribers (when available). Since the FCC 477 reports requires providers to submit data for all speed tiers within a census tract, only the highest maximum advertised speed for any given census tract was entered into the standardized spreadsheet in order to be compliant with the definition of broadband service.

The spreadsheets were then joined to a census tract feature class template that included the attribute fields from the NTIA schema. The resulting feature class was a geographical representation of the FCC 477 report including the technology of transmission and speed information. This feature class was used in conjunction with validated infrastructure data (i.e., central offices and/or remote terminals) to run the DSL or Cable geoprocessing models respectively.

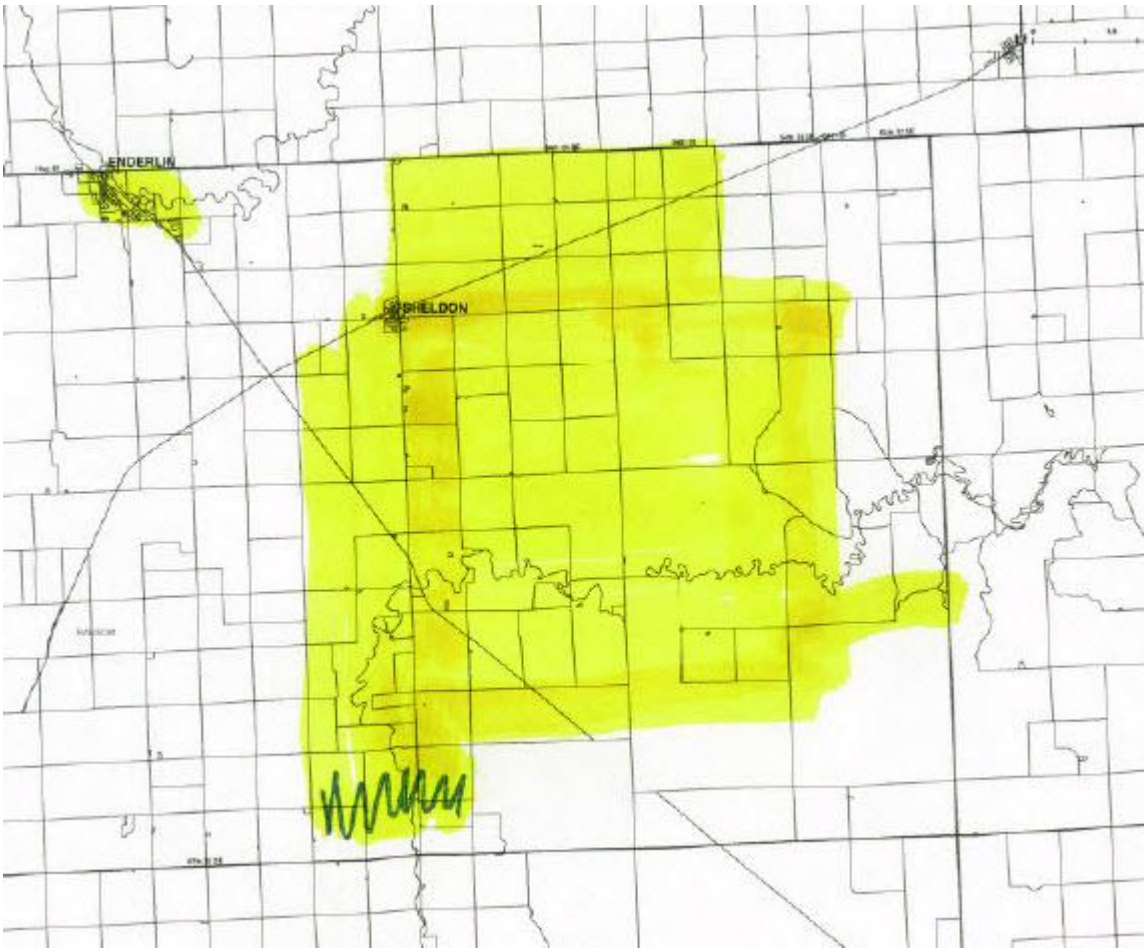
The resulting census block selection from the DSL or Cable model was displayed on a standardized review map and returned to the provider for confirmation.

Figure 10 Review Map Example



If additional edits were required the provider "marked-up" the review map(s) to indicate which census blocks should be added and/or removed. The provider submission was handled as a census block update (describe in the section below) from that point forward. In future updates from those providers FCC Form 477 data was not accepted and providers who originally submitted data in this format were asked to make edits to the review maps.

Figure 11 Provider's "Marked-Up" Map Example

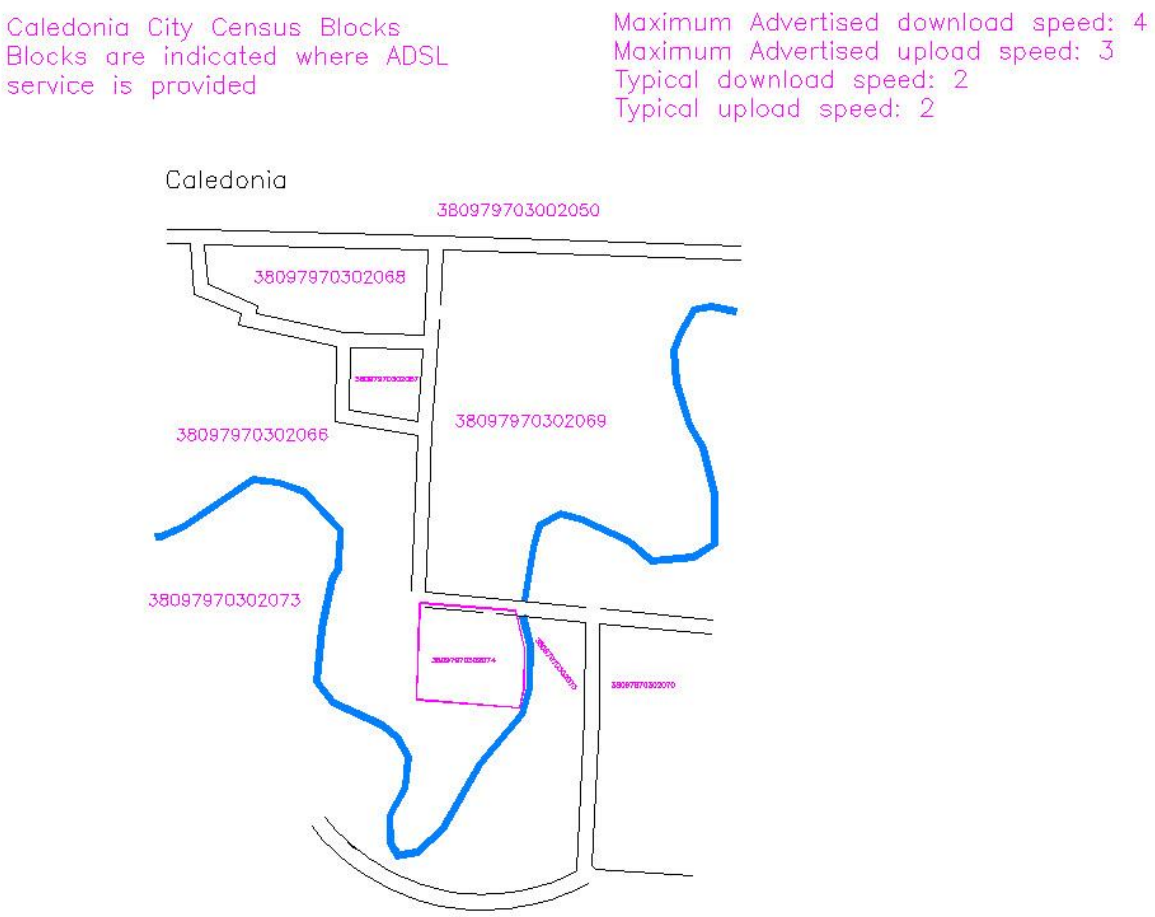


Several providers did not respond to the original confirmation maps and their final submission represented the best modeled estimate of their coverage at the census block level for DSL and/or Cable technologies. Providers that submitted FCC 477 data for fiber to the end user or fixed wireless could not be mapped and were not included in the final broadband map unless they provided additional data at the census block level or equivalent coverage at a similar scale.

Providers Submitting Census Block Coverage

Census blocks submitted by providers representing their broadband coverage area come in a wide range of formats including: analog and digital maps, CAD files, GIS shapefiles and geodatabases, tabular lists, and spreadsheets.

Figure 12 Census Block Submission Example



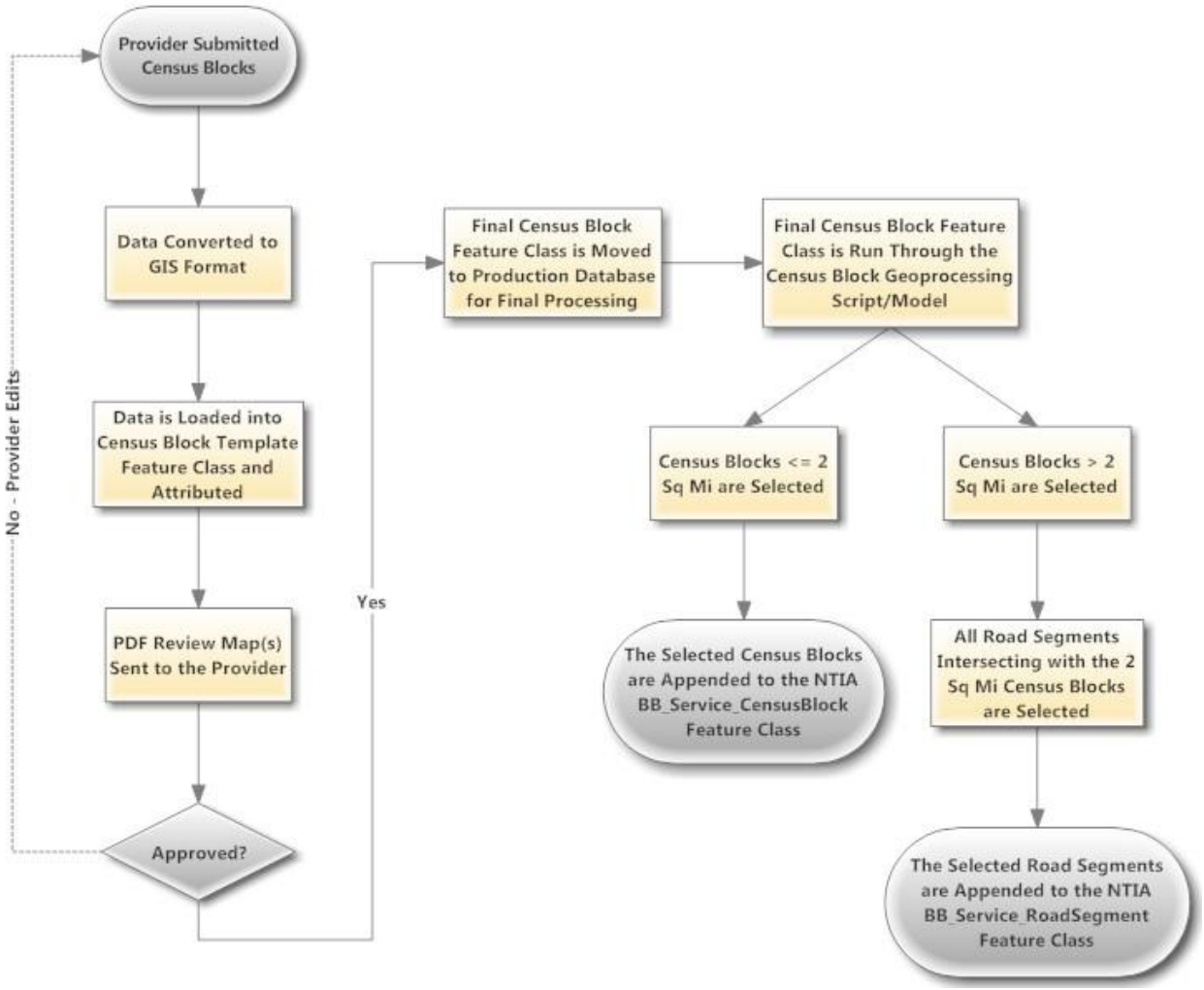
How They Were Handled

All census block submittals were loaded into a census block feature class template that included all of the attribute fields from the current NTIA schema. Census 2010 geography was used as required by NTIA. Domain codes were entered in the appropriate attribute field for technology of transmission, maximum advertised downstream speed, and maximum advertised upstream speed. If a provider did not identify the technology of transmission for a given census block or blocks, they were contacted by phone or email in order to obtain this information. In instances where speed information was not included in the data submission providers were contacted

and asked to supply this data; in cases where the provider refused to supply either the downstream, upstream, or both speeds, and their advertised speeds were not available on their web site, the lowest domain code was entered in the applicable attribute field.

Standardized confirmation maps were created for each provider by type of technology and sent to the provider for review. Once processing was completed for a provider's census block submission, the census block feature class was run through an Esri geoprocessing model that performed several quality control-quality assurance tests and selected census blocks less than or equal to two square miles and road segments that intersected census blocks greater than two square miles and were appended to the appropriate NTIA transfer data model feature classes.

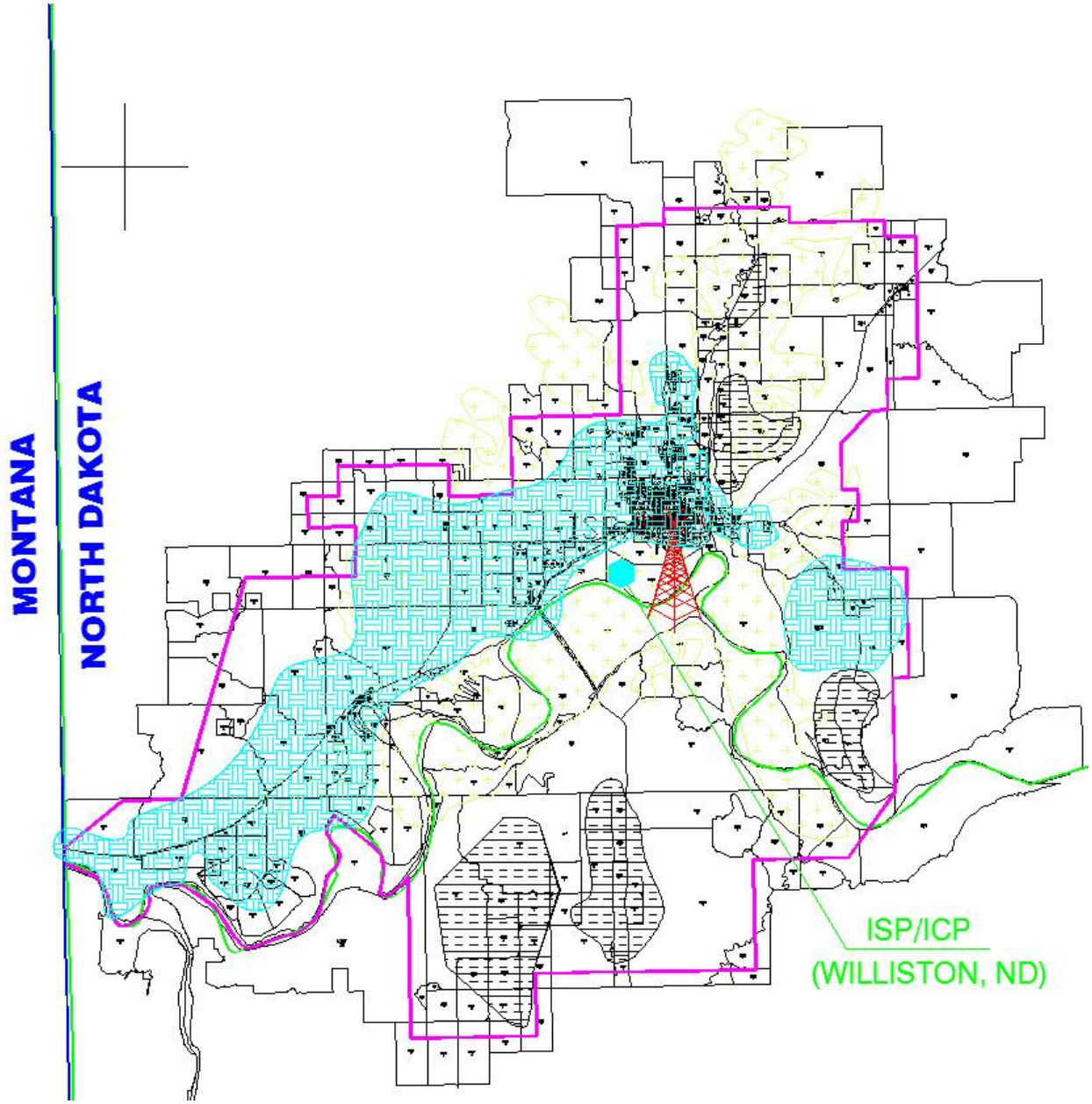
Figure 13 Census Block Geoprocessing Model



Providers Submitting Coverage Data

Provider submitted coverage data were differentiated from the other types of geographic data submissions coarser than a census block since they represented the full and explicit range of broadband coverage. Similar to the other types of data submissions, coverage data was also provided in a wide range for formats including: analog and digital maps, CAD files, GIS shapefiles and geodatabases. Coverage data was submitted by several providers or was available on several providers' websites.

Figure 14 Coverage Data Example



How They Were Handled

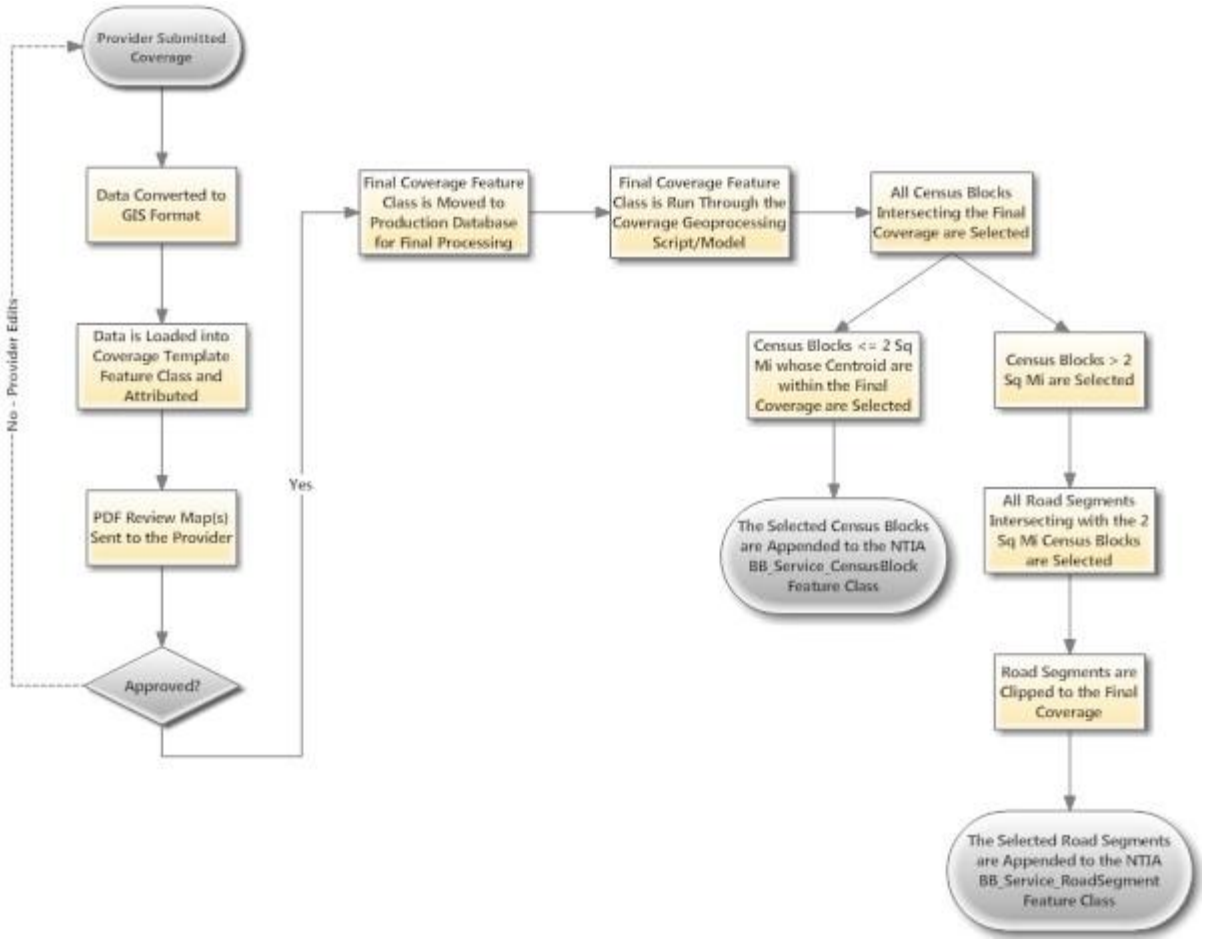
All coverage data was loaded into a coverage template feature class schema that included all of the attribute fields from the NTIA schema. The method of data loading was driven by the format in which it was received. Providers who supplied GIS shapefiles or feature classes could generally be loaded into the coverage template feature class schema using the simple data loader while CAD data had to be exported to GIS format prior to being loaded into the coverage template.

Coverage data supplied as digital or analog maps required georectification and digitizing prior to loading into the coverage template feature class. Domain codes were entered in the appropriate attribute field for technology of transmission, maximum advertised downstream speed, maximum advertised upstream speed, and spectrum. If a provider did not identify the technology of transmission for a given coverage area, they were contacted by phone or email in order to obtain this information.

When speed information was not included in the data submission, providers were contacted and asked to supply this data; in cases where the provider refused to supply either the downstream, upstream, or both speeds, the lowest domain code was entered in the applicable attribute field. If a provider did not specify the type and spectrum used for fixed wireless the default values for unlicensed were used.

Standardized confirmation maps were created for each provider by type of technology and sent to the provider for review. Once processing was completed for a provider's coverage submission, the data was run through an Esri geoprocessing model that performed several quality control-quality assurance tests and selected census blocks less than or equal to two square miles when the centroid of the census block was within the coverage area. Road segments that intersected with census blocks greater than two square miles were selected and then clipped to the coverage area in order to provide the most accurate representation based on the provided coverage. The selected census blocks and road segments were appended to the appropriate feature class in the NTIA data transfer model.

Figure 15 Coverage Geoprocessing Model

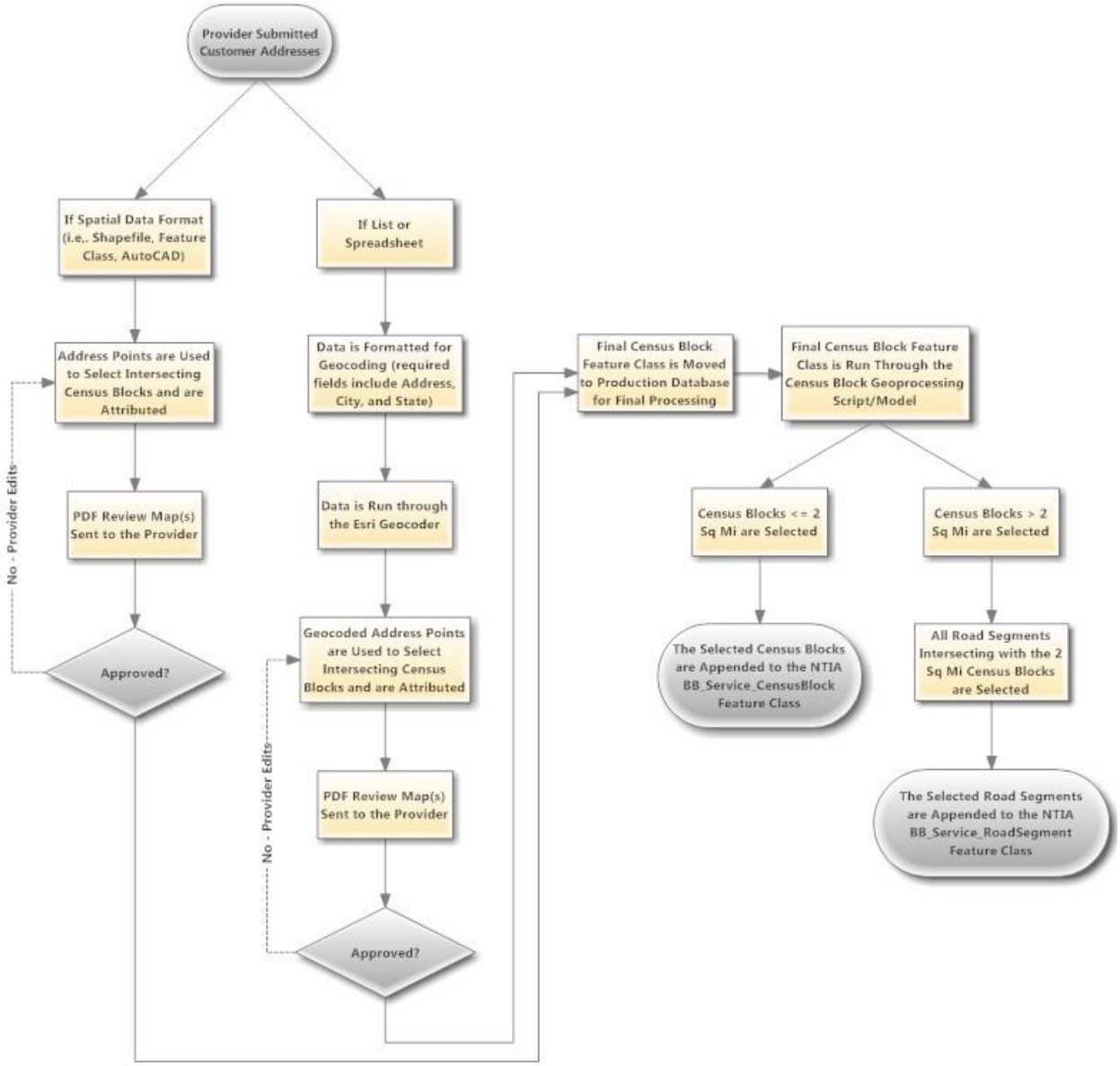


Providers Submitting Customer Locations

Providers that submitted customer locations typically fell into one of four categories. Several providers submitted customer locations in AutoCAD files, the points were exported to a shapefile and used to select all intersecting census blocks. Other providers submitted analog or digital maps that included customer locations, these images were georectified and census blocks were selected by an operator viewing the customer point images underlying the census blocks. Lists of customer addresses were also submitted. The data was loaded into a spreadsheet and geocoded using ESRI Business Analyst USA Geocoding engine. The geocoded points were treated identically to customer locations submitted in GIS or CAD format and used to select intersecting census blocks.

The resulting census blocks were added to confirmation maps and returned to the provider. If edits were necessary the provider indicated on the map which census blocks needed to be added and/or removed. The provider submission was handled as a census block update (described in the section above) moving forward. In subsequent updates subscriber address data was discouraged and providers who originally submitted data in this format were asked to make edits to the review maps.

Figure 16 Customer Addresses Geoprocessing Model



Providers Submitting Other Levels of Coarse Geographic Submission

This category had a wide range of submissions. The most common were telephone exchange areas or equivalent, wire centers, zip codes, counties or general references to towns or cities. These coarse geographic submissions were problematic because these areas were typically very large and lacked the detail of a defined coverage area resulting in over-exaggerated broadband coverage.

How They Were Handled

Operational rules established early in the project heavily scrutinized provider data that appeared to significantly over-represent broadband coverage and often resulted in a rejection of the submitted data. Providers who submitted coarse geographic levels of coverage data and infrastructure for DSL or cable modem service were initially that also were represented in the last point of aggregation infrastructure point file were sent estimated census block coverage maps and spreadsheets, and provided a second submission with finer level geography.

Providers submitting town locations for DSL or Cable were handled differently, and used as validation for central offices from the last point of aggregation table, and subsequently to run the DSL modeling routine or validate a cable or cable plus areas.

Cable Modem Geoprocessing Model

An ESRI geoprocessing model was created to generate coverage areas for Cable providers who did not submit census block or coverage data (i.e., census tract providers).

The most authoritative GIS layer available from the state with incorporated areas and city boundaries was used as a surrogate to model cable broadband coverage. Some towns that were not incorporated were also added. Municipalities and towns were sporadic in their digital update of these maps, since annexations and other boundary modifications were ongoing and difficult to maintain in real time updates. To compensate, likely areas contiguous to these city boundaries were added, labeled "Cable-Plus" in the operational data model. These additional polygons were determined using operator interpretation, road density, structures points from Info USA in Esri Business Analyst, speed test results, and in some instances NAIP imagery. In general areas were added that were immediately contiguous to existing city or town boundaries that represented likely areas where cable service existed. We were conservative in this approach and did not include populated areas near the cable plus boundaries unless they were directly contiguous to existing boundary areas.

Cable broadband providers primarily work under the structure of franchise agreements with municipalities. In the early rounds of broadband mapping updates, phone calls were made to

the largest cities in the state in order to obtain that respective city's cable franchise agreement. They were all either unknown or a text agreement without maps.

The full set of potential cable areas were then passed through validation sources to determine if cable was provided. This included public sources, such as the Warren Communications Cable Fact book (http://www.warren-news.com/factbook.htm).

The second and most authoritative form of validation was data received from cable providers at the census tract, block, or coverage level of geography. A spatial join geoprocessing operation was performed on these datasets with the full set of potential cable coverage areas in order to further validate areas with cable coverage.

The third source of validation came from the public speed test site maintained throughout the project. Whenever user submitted speed tests identified cable modem broadband service near or adjacent to existing estimated cable areas, the cable-plus boundaries were expanded using the same method of digitizing outlined above.

It was not possible to differentiate between technology of transmission codes 40 and 41 using this indirect mapping method. The only authoritative way to determine this information was from data submitted by a provider. In all cases where the provider did not indicate the type of cable modem technology being used, the code for Cable Modem-Other (41) was assumed.

DSL Geoprocessing Model

An ESRI geoprocessing model was created to generate coverage areas for DSL providers who did not submit census block or coverage data (i.e., census tract providers). This model is based on typical DSL technology which can provide service up to 18,000 feet from a central office or remote terminal, unless otherwise specified by a provider.

Since DSL lines are typically buried alongside roadways, underneath roadbeds, or strung on aerial telephone lines which tend to run alongside a road, a GIS dataset of a state's road network were used as a surrogate to model DSL areas. In the initial rounds of broadband maintenance we purchased commercial (GeoTel) and publicly available data sources representing last points of aggregation (LPA) for DSL, including central offices and remote terminals. Each LPA was validated based on publicly available data, provider data, and independent measurements. LPAs were used in a DSL model only if they were supplied directly from a provider or could be verified by two or more sources. The actual geoprocessing model used the validated central office and remote terminal locations to generate a raster cost surface based on all of the available roads radiating out 18,000 feet from each active LPA point. The raster coverage was converted to a polygon feature class and a small back-buffer was applied to achieve the final DSL coverage polygon representing a provider's maximum possible DSL coverage area. The DSL coverage areas were then used to select intersecting census blocks and road segments.

Remote terminals were provided or publicly available for only a small number of providers, therefore this method may tend to underestimate the full DSL coverage for a provider.

It was not possible to differentiate between ADSL or SDSL based on the LPA data; the only authoritative way to determine this was from data submitted by a provider. In all cases where the provider did not indicate which type of DSL service was being provided, the technology code was assigned to 10 "Asymmetric xDSL".

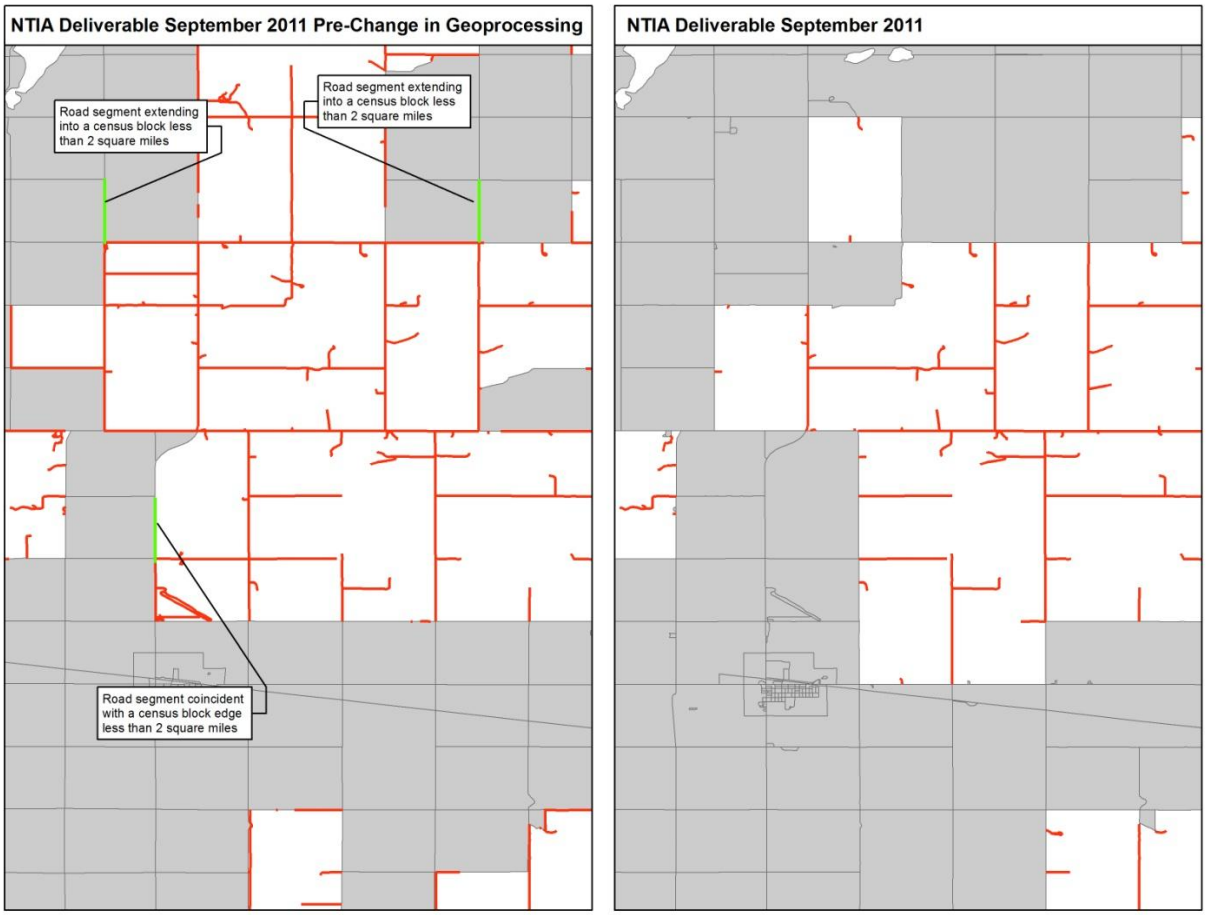
2000 T0 2010 Census Block Conversion

The September 2011 deliverable to NTIA required the transition from 2000 census data to 2010 census data, but the conversion process was dependent upon the type of data submitted by a provider. These providers fell into two categories, block providers or coverage providers. The conversion to 2010 census geography was a straightforward process for the coverage providers; the reference to the census block data in the geoprocessing model used to select census blocks and road segments was simply changed from the 2000 data to the 2010 data and each provider's data was re-run. The conversion from 2000 census to 2010 census data for block providers required several geoprocessing steps due to the inability to simply match census block IDs across vintages. The census blocks for each provider were dissolved by type of technology to form a quasi-coverage area. The dissolved blocks were then used to select any 2010 census block whose centroid fell within the "coverage area."

Road Segment Geoprocessing Change

Prior to the September 2011 NTIA data submission, road segments in census blocks greater than 2 square miles were selected with a straight intersect. This resulted in road segments being selected that were coincident with census block edges in blocks less than or equal to 2 square miles. Using this same geoprocessing methodology combined with the new 2010 census blocks and TIGER roads, road segments were selected that were coincident with census block edges and that extended into census block less than or equal to 2 square miles. We believe this "error" occurred due to the improvements in the spatial accuracy of both the 2010 census blocks and road segments for 2010 where features were now coincident. For the September 2011 submittal a small negative buffer (-0.5 feet) was applied to the intersect to avoid selecting roads that were coincident with census block edges and/or those that extended into census blocks less than 2 square miles. This resulted in a significant decrease in the number of road segments reported but overall we believe this method more accurately portrays each provider's coverage area.

Figure 17 Road Segment Geoprocessing Change Example



Wireless Coverage

Three forms of wireless coverage were provided in this table, fixed point to point wireless, mobile wireless and satellite. No public data was located on fixed wireless infrastructure points, except notification of availability on provider's web pages, and in some instances, specific towns, recreation or commercial locations where wireless service was provided. No modeling was attempted on fixed wireless coverage. All coverage came directly from providers or was mapped from locations provided on a provider web page and was processed using the web-based application. We did not attempt any propagation modeling on fixed wireless, since that can be influenced by local structures and vegetation in the vicinity. A few providers did provide coverage that appeared to be derived from propagation modeling.

Most of the public data research focused on mobile wireless providers using cellular service spectrums. The Federal Communications Commission (FCC) Universal Licensing System (ULS) is the consolidated database and application filing system for most Wireless Radio Services. ULS supports electronic filing and provides public access to licensing information, weekly Public Notices, FCC rulemakings, processing utilities, a telecommunications glossary, and much more." The FCC ULS Advanced Licensing Search was queried for all FCC licenses filed in the state; a relational database was built from the results. Information from the database was extracted in order to perform the cellular tower propagation modeling for wireless broadband.

The FCC ALS and ULS reporting systems were the source for most of the tower locations. Towers were required to be licensed when they meet specific published criteria. These included some variables that could be modeled with GIS statewide, such as varying proximity to airports and heliports, combined with specific local level criteria not easily obtained or modeled statewide such as the grade construction within proximity of these, and any structure over 200 ft in height. A number of cell towers providing broadband were likely not located in the FCC database. None of the mobile wireless providers were willing to provide infrastructure such as tower locations and parameters, and the coverage provided were very generalized.

Any fixed or mobile wireless antenna or tower location submitted by a provider, or obtained from the FCC that was used in the final processing for wireless broadband coverage was maintained in the operational database for last point of aggregation, and subsequently transferred to Table 3 backhaul and middle mile points.

Providers submitted coverage data in a wide variety of formats, levels of completeness, and at varying geographic scales. All types of data was accommodated and processed whenever possible. An open structure process for submittals was allowed, accepting any data, and

attempting to work with the provider when questions arose. If data was submitted by a provider in a format that did not allow a direct coverage to be mapped, such as a coarse level of geography such as a census tract, or county, feedback was provided to the providers in the form of standardized spreadsheets in an attempt to standardize the inputs, and increase the geographic granularity of the provider data submission. Although each provider had individual characteristics and nuances in their data submissions, some data patterns can be described generalizing the typical types of submissions. In general, for fixed wireless to be mapped it was necessary to receive data from a provider, since there were no public sources available on point to point wireless tower locations in public form, except as depicted on providers web pages in a few instances.

Providers Submitting FCC Form 477 Report or Similar Format

Geographically, these were lists of census tracts of coverage, accompanied by additional documentation on technology of transmission, speed tiers, and number of customers. Providers submit these twice a year to the FCC and recent submissions have been done using a structured web site maintained by the FCC. A few providers submitted printouts that appeared to be from this web format and were typically complete and standardized. More providers submitted spreadsheets roughly in the F477 format, but with modified and generalized data.

How They Were Processed

If the providers identified specific coverage areas as census blocks, or direct coverage area, or as infrastructure tower locations, they were processed and mapped. Providers identifying census blocks were processed by dissolving the census blocks into single coverage polygons by speed tier. Providers identifying a direct coverage area were converted directly to GIS polygon files and attributed. Providers submitting tower locations were mapped as circular polygons centered on the tower with a radius averaging 10 miles measured as Euclidian (straight line) distance from the tower. Providers that specified variable radius were mapped as circles at the radius they submitted.

Providers Submitting Census Block Coverage

A few providers submitted coverage as census blocks, either through a tabular listing of census blocks or spreadsheet, or in map format. It was common that a provider where public data indicated multiple technologies of transmission only submitted some of the technologies of transmission.

How They Were Processed

These were loaded directly into the master Census 2000 block coverage by provider and attributed with available data submitted by the provider. In instances where some data attributes were missing, such as advertised or typical speed tiers, or subscriber data, the data attributes were left blank or null. Providers identifying census blocks were processed by

dissolving the census blocks into single coverage polygons by speed tier. A visual inspection of independent speed test data overlaying the provider submitted block coverage was completed, but no action was taken to override a provider's submittal.

Providers Submitting Actual Coverage Maps

Coverage maps were submitted by several providers, or coverages were derived from public sources or from other indirect indicators of coverage such as customer point maps or tabular lists in text or spreadsheet format. These were differentiated from the other types of geographic submission coarser than a census block since they represented the full and explicit range of coverage.

How They Were Processed

Coverage maps were treated as explicit coverage and all census blocks intersecting any portion of a coverage were selected and attributed with the provider coverage by technology of transmission, and all related attributes were transferred to the census block representation. The method of creating the coverage varied by source. Providers who supplied broadband coverage as a GIS polygon or CAD feature were converted to polygons. Some providers, including non-responsive providers who did not submit anything to the project, had published coverage maps of various forms on their web sites or submitted an image in jpg, tiff, pdf or other graphic format. These were georectified to base map layers, typically roads, but sometimes other features such as state or county boundaries or towns, and subsequently converted to polygon features. Then they were intersected and transferred to census block feature classes like the digital GIS submissions. Providers who submitted customer locations typically fell into four categories. Some were submitted as AutoCAD files where the points could be transferred to the GIS, then spatially joined to the census blocks they were located within. Others submitted maps in image format that were georectified in the same manner as other images, then census blocks were selected by an operator viewing the customer point images underlying the census blocks. When customer lists were submitted, they were loaded in a database and geocoded using ESRI Business Analyst USA Geocoding engine based on TeleAtlas road features. The geocoded points were subsequently treated identically to customer locations submitted in GIS or CAD format, and spatially joined to the census block template file. A visual inspection of independent speed test data overlaying the provider submitted block coverage was completed, but no action was taken to override a provider's submittal.

Providers Submitting Other Levels of Coarse Geographic Submission

This category had a wide range of submissions. The most common was as telephone exchange areas or equivalent, wire centers, zip codes, counties or general references to towns or cities. The problem with these submissions was that often a given polygon overlapped a census block or multiple blocks, and in most cases, they were much larger geographic entities than a census block.

How They Were Processed
Our operating rules established early in the project did not allow final provider coverage to significantly over represent provider coverage. Those providers that submitted coverage area by coarse geographic features and did not specifically identify coverage as a coverage layer or census blocks were not able to be processed. No interpolated data was used to calculate these data, if the data was not provided by a provider in a format capable of processing; the data was not calculated for that provider.

Satellite

Satellite coverage for the entire state was included for the three satellite providers: HNS License Sub, LLC, StarBand Communications Inc., and WildBlue Communications, Inc.

Community Anchor Institutions

Lists were obtained from the state and affiliated processional organizations for anchor institutions to be included in the broadband mapping in each of the community anchor institution community code categories. These were sorted and cross referenced and an initial round of elimination of duplication was accomplished.

All institutions on the initial draft spreadsheets used for the first two submittals were geocoded using ESRI Business Analyst Desktop with the USA Geocoding engine using TeleAtlas premium road features. This was judged to be the best available geocoding source for batch processing of addresses. No commercial source is 100% accurate in a primarily rural state such as this with low population numbers compared to other states and no large cities or metropolitan statistical areas. In subsequent rounds of updates since the first two submittals, we have used the same geocoding engine from Esri Business Analyst, but the geocoding locator switched to NavTech geocode locator. In every round of geocoding we used conservative matching criteria, and maintained and stored the type of match (building match, address match, or zip code match), along with a record of those not matching and not able to geocode.

All geocoding is dependent on accurate road locations and complete and accurate street segment attribution. The GIS road layers available from the state were not judged as complete as the premium commercial sources. The Tiger 2009 road files, while spatially comparable to the commercial sources, have a large percentage of null values in the database attribution and street segment address ranges necessary for accurate geocoding. As in most parts of the country, geocoding is more accurate in urban settings than in rural routes. Complicating the process in a rural state for anchor institutions are the situation where some anchor institutions, such as public safety anchors are often staffed by volunteer staff and a post office box is the

only valid address, and the physical address is wherever the public safety equipment is parked or stored at any given point in time.

Category codes were assigned based on the original source list and from keywords in the name of the institution and independent research. Technology of transmission and advertised speeds were obtained when possible, which initially was entirely based on the anchor institutions maintained by the state for consortiums providing state service contracts. Two iterations were accomplished with these state maintained lists, and all available attributes were obtained with assistance of the state analysts.

After initial data collection, analysts worked on researching, calling and improving the addresses for those below an 80% match criteria. Many on the 70 percent matching range were fairly accurately located. The difference between a 70% and 80% match typically occurred when an address lacked a prefix or suffix cardinal direction on a street that had two cardinal directions (example 101 1st Street, on a street segment with 101 N. 1st Street and 101 S. 1st Street). Analysts were also able to obtain physical addresses for some lists supplied by the state with only a P.O. Box.

The lists with updated and corrected addresses were re-geocoded for the final mapping effort, and any anchor with any level of geocoding was included on the final map. The operational database identifies the type of match, so future maintenance cycles can be prioritized and targeted to those matching only zip codes or with address changes.

From the results of the previous step some attribution of database attributes for attributes with null values was accomplished. This step was rule based. The attribute of whether an anchor institution subscribes to broadband service could only authoritatively be answered yes, if the information was provided by the state, or a confirmation from an anchor speed test could be matched. Those anchors that were located within an area covered by a DSL, cable, other copper or fixed wireless were also assumed to have the ability to subscribe to broadband coverage and were also estimated to be subscribers. Assigning the technology of transmission and the advertised speeds (which required identifying a provider for the anchor institution) was only possible on a subset of all coverage in those areas where only one provider/technology of transmission was present. This allowed a few hundred more anchors to be identified, but typically only occurred in rural settings. Most urban settings had multiple providers. In addition many providers submitted multiple technology options, so identifying one provider/technology of transmission combination was not possible even if there was only one provider possible for the anchor institution.

It is likely that in some instances in the rural settings and small towns an anchor institution may rely on mobile wireless broadband. This is common in public safety mobile equipment such as vehicles, but likely less common in anchor facilities. For the purpose of assigning attribution to

anchor institutions with remaining null attributes, we took a conservative approach and did not overlay anchor institutions on mobile wireless coverages to assign attributes.

Maximum advertised downstream and upstream speeds were not available or collected for any of the CAIsA new domain value of "U" for Unknown was added to the data model for the current submission, and all values formerly coded as 0, were changed to "U".

A new optional attribute was requested by NTIA requesting knowledge about the presence or absence of WIFI at the CAI location. This was not researched and attributed by the state in the current submission. All records were set to "Unknown" for the attribute, Public Wi-Fi.

In the first two submission processes for geocoding we used conservative matching criteria, and maintained and stored the type of match (building match, address match, or zip code match), along with a record of those not matching and not able to geocode.

A new optional attribute was requested by NTIA after the initial maintenance updates requesting a CAI unique identification number for K-12 schools, libraries and colleges and universities. The following steps were completed for this request: Added CAIID for the Library category using the NCESID from http://nces.ed.gov/surveys/libraries/librarysearch/ ; Added CAIID for the University, college, other post-secondary category using the IPEDS ID from http://nces.ed.gov/collegenavigator/ ; Added CAIID for the School – K through 12 category for public schools using the NCES ID from http://nces.ed.gov/ccd/schoolsearch/ ; Added CAIID for the School – K through 12 category for private schools using the PSS_SCHOOL_ID from http://nces.ed.gov/surveys/pss/privateschoolsearch/

A new optional attribute for the URL for each anchor institution was requested by NTIA. Assigned URLs to CAI records: for the University, college, other post-secondary category assigned the URL from http://nces.ed.gov/collegenavigator/; for the Library category added the URL from http://nces.ed.gov/surveys/libraries/librarysearch/

Middle Mile

Middle mile and backhaul points were included for all public data and provider submitted infrastructure judged to be reliable and valid. A systematic reliability (geographic scale and authority of the source) rating and a validity rating (cross referencing between multiple sources) were developed and used throughout the project, both on a scale of 1-10, along with feature level metadata to maintain the last point of aggregation. A persistent unique identifier was used to track each point and each instance of a point as they moved through the system and improved in quality. Old points were retired but were not deleted from the operational database. Only active records were used in the final processing.

A feature class labeled "Last point of aggregation" (LPA) in the operational database was created to hold point locations of broadband infrastructure (examples include central offices, remote terminals, head ends, etc.). Addresses purchased or obtained at any level of geography were geocoded to a street address (using ESRI Business Analyst and TeleAtlas data) or located more generally to the center of a town (snapped to the USGS Geographic Names Information System location) when no address information was available. and All mobile wireless locations obtained from public sources or commercial sources that were not already validated were confirmed using NAIP aerial imagery and Google Street View (when available). All FCC tower locations included a latitude and longitude, however all towers were validated and moved to the NAIP aerial imagery location.

A reliability code indicating the source and geographic scale represented as an integer from 1 (low) to 10 (high) was assigned. Validity codes were assigned cross-referencing public and provider data submissions; it was also rated on a scale of 1-10. A point with a validity code of 7 that fell within a provider's coverage for DSL, mobile or fixed wireless, or was used in a final modeled coverage was included in this table. In addition, backhaul points identified by the state, by providers and consortiums providing services to the state and anchor institutions, were included in the table. Providers were typically reluctant or unwilling to provide infrastructure data, and often unwilling to confirm data obtained through public sources. The methods used in the state allowed a significant level of identification and mapping of infrastructure locations and feature level metadata on reliability and validity of point locations, but data on owned or leased characteristics, serving facility codes, and for elevation of infrastructure was confirmed by few providers who responded directly in a spreadsheet provided to them to list infrastructure.

Speed Test Data Processing

A public facing website was created in the spring of 2010 asking internet users in the state to complete a brief survey regarding their internet connection and run a speed test on their connection using the Ookla speed test. The speed test site asked that a user enter their location as an address on a Google map interface. If the address did not geocode to their satisfaction, the user could choose to move the place mark to their desired location. Next, users were asked to select their technology of transmission from a list, enter their provider in a free form text field, complete an optional questionnaire, and run a standard speed test on their connection. The date and time, and IP address of the user were captured during the speed test.

All speed tests were geocoded, and the IP address was looked up in batch mode in the WHOIS database returning one or two providers registered with WHOIS. All speed tests were cleaned and analyzed against provider submissions and models. For the first two submissions a final

provider assignment was assigned by examining the WHOIS fields, and the provider submitted by users. Consistent rules were not always possible, but generally when two WHOIS records were returned, the second more specific WHOIS provider was selected. In some instances, where the WHOIS providers were backhaul or other and were not providers meeting the NOFA criteria, the user submitted provider designation was cleaned and standardized and assigned as the final provider

There was considerable variation between the user reported technology of transmission (TOT) and the known technologies for any given provider. Records were divided on unique provider/ TOT combinations for the first and second submissions, which limited the record count in many instances. For the current submission the records were divided only by provider, not taking TOT into consideration.

For the first two submissions, the speed test records were used in two ways for the final processing.

1) As an independent measurement to validate the presence/absence of a provider coverage for DSL and/or Cable technologies.

In the first submission a few providers were identified as DSL broadband providers based primarily on speed tests. In these instances, DSL models were executed for both providers based on verified central office locations. Some speed tests with an identified technology of transmission of Cable Modem were used to expand “likely” cable areas which were typically adjacent to incorporated and urban areas. These “cable-plus” areas were created to supplement submissions from Cable Modem providers who did not provide detailed coverage or census blocks. No new DSL providers or Cable providers were identified using speed tests in the current submission.

2) As an independent measurement for typical upload and download speeds.

Once data were cleaned and final provider and technology of transmission assigned, these fields were concatenated. In the first two submissions, if the remaining records exceeded 10 for the combination of provider and technology, and the speed test was successfully completed (values > 0) the average value and standard deviation of the download speed were calculated. Any values exceeding 1 standard deviation were removed as outliers, and the mean of the remaining records within 1 standard deviation was calculated for the download and upload speed. This value was reported for each provider/technology of transmission record as the typical speeds for that provider. In some instances the typical speed was lower than that required to meet the definition of broadband by NTIA, but that did not preclude the records from being included in the broadband map in the first two submissions as it did in the current submission.

For the current submission, these procedures were modified and all records were re-run. The steps of the current processing are provided below. The primary procedural change was to drop the validation of the presence/absence of provider coverage for DSL and/or Cable technologies, since providers had been validated in the first two submissions and potential new providers identified through additional speed tests were determined to not meet the NOFA criteria for being considered a broadband provider. The use of the speed test data for determining typical speeds was implemented with similar rules as the first two submissions with the exception of the use of the technology of transfer, and raising the minimum number of speed tests to 15, after removing outliers, to be used in typical speed calculations. Procedurally, the process was also automated with a Python script to improve processing performance and minimize quality control/quality assurance testing.

Typical upload and download speeds for all providers with less than 15 processed speed test records were coded as null values. In addition, based on telephone communication with NTIA on March 9, 2011, all typical speeds less than minimum NOFA upload of download speed criteria were also ignored and reported as null. Based on a related request in the same communication, the typical speeds greater than the advertised speeds were ignored and reported as null. Processing steps for the current submission are provided below:

1. Speed test records were imported into a SQL Server data file, adding fields Final Provider and IPGroup to the initial records.

2. IPGroup attribute was set by extracting the left three nodes of the IP Address of the speed test (e.g. 161.7.1.236 had 161.7.1) moved to the IPGroup attribute.

3. An IPGroup to Final Provider cross reference table was created to determine the final provider from the unique three part IPGroup.

4. Each IPGroup was reviewed with the data in the WHOIS 1 provider, WHOIS 2 provider and then the user specified provider to determine the most authoritative final provider from the official list of providers. None of the WHOIS or user submitted fields were absolutely authoritative in all instances, so expert opinion by technicians knowledgable of the providers was used in some instances to assign the IPGroups, and subsequently the Final Provider attribute.

5. Run a python script to remove outliers and calculate summary statistics for each Final Provider assignment. The rationale for removing outliers was to mitigate the many variables that effect a typical speeed test, such as the time of day, others on the network, etc. The script implemented the following work flow rules:

a. Use all records for each unique FinalProv attribute value with D_kbps greater than 0 or U_kbps greater than 0 , then:

b. Calculate a mean for the unique provider group for each D_kbps and U_kbps.

c. Calculate a standard deviation for the unique provider group for each D_kbps and U_kbps. Each speed attribute was calculated independently of the other.

d. Subtract the outliers (if any) higher or lower than one standard deviation from the mean.

e. Calculate the median value of the remaining non-outliers for each provider D_kbps and U_kbps respectively.

f. Create a summary table with the final calculated assignment of FinalProv, D_kbps and U_kbps.

6. Post process the summary table in the following sub steps:

a. Join the summary tables by provider for the upload and download speeds into one summary file including the number of records or frequencies for up and down speeds for each provider after removing the outliers, and the mean up and down speeds in kilobits per second for each provider.

b. Select "FreqDown" < 15 AND "FreqUp" < 15 then delete the resulting selection set from the joined table. The FreqDown/Up fields counted the number of speed test records for a provider after the outliers more or less than one standard deviation from the mean value were removed from consideration.

c. Select "D2_kbps" <= 768 kbps AND "U2_kbps" <= 200 kbps. then delete the resulting selection set from the joined table.

7. Import the remaining valid mean values for each provider into the appropriate broadband coverage feature classes.

8. Select any typical speeds greater than advertised speeds either up or down, and make the resulting records null in the final broadband coverage feature classes (as per NTIA request 3/9/2011).

Reliability, Validity and Completeness

Reliability codes apply to the source data points and polygons and assess the authority of the source we obtained the data from and the level or coarseness of the geography (address or town). Validity codes are determined from cross checks of data sources and the number of independent sources of verification. These are as simple as comparing speed test locations against DSL modeled polygons, or as complex as geospatial analysis operations such as a kernel density function cluster analysis. Completeness is determined by public sources, independent measurements or provider submittals and checks on the domain classes required for the final NTIA deliverables such as Technology of Transmission domains, Speed Test domains and serving facility and wireless spectrum facility types and categories. The categories for these, and the subsequent records in our operational geodatabase tables have the ability to grow and change as new data is obtained. New data for wired We are maintaining these as feature level metadata tied to points and polygons maintained by analysts and technicians in a wiki table and coding them to the geodatabase. In this way the unique situations that arise can be cataloged and maintained with some level of flexibility while contributing to the final indices in a controlled fashion.

Reliability Codes

Throughout the course of the broadband project the State of North Dakota has employed several validation and verification techniques to help quantify the accuracy of the broadband map. The techniques used are listed below:

- Reliability Codes Assigned to Infrastructure Points
- State Run Speed Test Portal
- State Wide Broadband Survey

The two factors incorporated in reliability codes include the level of geography that was used as a source or provided as a clarification of location and the authority of the source for the information. We are also considering clusters of point information from independent measurements and sources to be higher in reliability than individual point information.

Generally, the coarser the source geography the lower the resultant score. Everything besides an address or street intersection, latitude/longitude location, or location provided in a georeferenced digital source is assigned a reliability score less than 5. This applies to source data coming (e.g. a central office located in a city instead of an address) and review comments on a previously mapped location (e.g. “That location is wrong, I know it is on the south side of town”).

We have incorporated the reliability code into our last point of aggregation (LPA) and provider coverage geodatabase files, and into some of the publicly available data (PAD) geodatabases.

We are also carrying a short text field (50 characters) with a descriptive rationale for the score. This will allow us to focus more on the lower scores that need to be confirmed, and ignore the high confidence data scored as 9 and 10.

Reliability Codes		
Code	**Description**	**Detailed Description**
0	Not assigned	• Not yet assigned
1	Level 1	• Checked but unverified
2	Level 2	• County • Presence by other coarse geography (e.g. administrative region)
3	Level 3	• City • Census tracts • Cable Plus (area likely to have been annexed into an incorporated town or CDP)
4	Level 4	• Cable - incorporated • Zipcodes • Census blocks
5	Level 5	• GeoTel unverified • Confirmed by provider or anchor institution key advisor but to geography coarser than address or intersection
6	Level 6	• Qwest/Midcontinent or other web site random testing check • Speed test from individual average residential
7	Level 7	• From anchor institution key advisor Webex • GeoTel verified address only with no 3rd party confirmation from public sources ○ Building unverified • Speed test from anchor institution

8	Level 8	• From provider
		• FCC ULS or ARS
		• Geotel verified address and possibly verified by 3rd party source (Google Streetview)
		  ○ Another provider's sign is on building (usually Qwest)
		• Geotel possibly verified by 3rd party source (NAIP, Google Streetview)
		• From state authoritative public data source (e.g. DCN or SummitNet)
		  ○ Address or building unverified
		• Speed test from cluster of average residential

9	Level 9	• From provider as coverage with authoritative confirmation
		• Geotel verified address and verified by 3rd party source (NAIP, Google Streetview)
		  ○ Provider sign on building
		  ○ Tower or dish visible
		• From provider or anchor institution check of our data * Root Wireless

10	Level 10	• From 2+ authoritative confirmations

Validity Codes

We included validity codes in the last point of aggregation infrastructure data which drives creation of the DSL models. We also included validity codes in each of the final technology of transmission deliverables for polygons and point feature classes. The scales of validity vary by each major type and function.

Infrastructure Validity Codes

The purpose of this validity code is twofold:

1. To determine which infrastructure points are turned into DSL model coverages
2. To use as a reference in other coverage validity checks

Infrastructure Validity Codes		
Code	**Description**	**Detailed Description**
0	Level 0	• Not yet assigned
1	Level 1	• Not yet assigned
2	Level 2	• Not yet assigned
3	Level 3	• Checked against ND PSC Report or DSLReports at the town level • Checked against DCN anchor institution data
4	Level 4	• Checked against two or more independent public sources at the town level • Checked against provider public data (e.g. Qwest ICONN) at the town level
5	Level 5	• Not yet assigned
6	Level 6	• Confirmation of DSL or cable from authoritative public data to broader geography than address not confirmed by provider
7	Level 7	• Authoritative public data at address level (e.g. Geotel) not confirmed by provider
8	Level 8	• Provider submission at the census tract level • Provider website independent address checks (Qwest, Verizon)
9	Level 9	• Provider submission at the census block level or address level
10	Level 10	• Provider submission at the coverage level at census block scale or blocks less than 2 square mile and larger scale then census block for blocks larger than 2 square miles

Final Technology of Transmission Validity Codes

The purpose of this validity code is twofold:

1. To determine which elements are loaded in the spreadsheet provider submission packages in their review

2. To determine which provider coverages are chosen for submittal with one of the NTIA deliverables

Final Technology of Transmission Validity Codes		
Code	**Description**	**Detailed Description**
0	Not assigned	• Not yet assigned
1	Level 1	• Unassigned at this time
2	Level 2	• Unassigned at this time
3	Level 3	• Checked against ND PSC Report or DSLReports at the town level • Checked against DCN anchor institution data
4	Level 4	• Checked against two or more independent public sources at the town level • Checked against provider public data (e.g. Qwest ICONN) at the town level
5	Level 5	• Confirmation of DSL or cable from authoritative public data
6	Level 6	• Provider website independent address checks (Qwest, Verizon) • Provider submission at the census tract level
7	Level 7	• Provider submission at the census block level • Provider submission at the census block level confirmed by Speed test cluster OR other independent measurement
8	Level 8	• Provider submission at the address level
9	Level 9	• Provider submission at the address level confirmed by Speed test cluster OR other independent measurement
10	Level 10	• Provider submission at the address level confirmed by Speed test cluster OR other independent measurement

Quality Assurance Testing

A separate analyst checked each provider submission. Due to the variety of provider submissions, the analyst originally doing the work and the analyst checking discussed the interpretations when the criteria were subject to interpretation.

Coverage, technology of transmission, and speed tier were checked completely for each provider.

Many of the models and block, tract and coverage level processes were completed with ESRI Modelbuilder and Python scripts, and these methods were tested for quality assurance in the preliminary mapping stages and in the initial sample data submissions to NTIA.

All providers who submitted geographic coverage coarser than a census block were provided a data checking package to assess for accuracy and completeness. Any comments received from providers were processed.

1. QA/QC Checks prior to Individual Data Processing (i.e., block or coverage geoprocessing model). [Automated Modelbuilder tools and follow-up by an analyst]
    a. Check for inconsistencies within the Provider Name, DBA Name, FRN
    b. Check for duplicate census blocks or coverage areas
    c. Check the Provider Name, DBA Name, FRN against the "Official Provider Table"

2. For each provider after initial data processing is completed [Review by an analyst that did not process the original data]
    a. Review correspondence log
        i. Review recent correspondence, since previous NTIA submission
        ii. Note changes/additions/comments on coverage area, technologies, speeds, infrastructure, subscriber weighted nominal speeds (SWNS)
    b. Review wiki data processing page (current metadata)
        i. Note changes/additions/comments on coverage area, technologies, speeds, infrastructure, SWNS
    c. Review individual Provider Wiki page (historic metadata)
        i. Note changes/additions/comments on coverage area, technologies, speeds, infrastructure, SWNS
    d. Check Provider Data Folder
        i. Review recent data submissions, since previous NTIA submission
    e. Check Working Data Folder
        i. Review current update feature class geography
        ii. Review coverage with provider's submissions
        iii. Review technology of transmissions (TOTs) with provider's submissions
        iv. Review Max Adv Speeds: Down/Up with provider's submissions

3. For each provider after final data processing is completed [Review by an analyst that did not process the original data]
    a. Check PROVCOV_Master geodatabase:Provider Blocks feature class and/or Provider Coverage feature class
        i. Review geography
        ii. Review TOTS
        iii. Review Max Adv Speeds: Down/Up

4. Check Infrastructure feature class [Review by an analyst that did not process the original data]
    a. Review recent submissions, since previous NTIA submission

5. Check SWNS feature class [Review by an analyst that did not process the original data]

a. Determine if provider submission is valid

6. For each provider after speed tests are processed [Review by an analyst that did not process the original data]
    a. Check PROVCOV_Master geodatabase for Typical Speeds: Down/Up

7. QA/QC Checks and Reports on the Final NTIA Deliverable [Automated Modelbuilder tools and follow-up by an analyst]
    a. Check the Provider Name, DBA Name, FRN against the "Official Provider Table" for each NTIA feature class (i.e., BB_Service_CensusBlock, BB_Service_RoadSegment, BB_Service_Wireless, etc.). NTIA_Provider_Name_DBA_FRN_Errors_Sample.xls, looks at each NTIA feature class (i.e., census blocks, road segments, wireless, etc…) and checks to see if there is an identical match in the "Official Provider Table." If an identical match does not exist for that Provider Name, DBA Name, FRN concatenation it is written to a geodatabase table along with the NTIA feature class where the "error" occurred. When an "error" does occur it then has to be checked by an analyst and corrected if necessary.
    b. Change Detection Report – This geoprocessing model compares and reports any changes in the Census Block, Road Segment, and Wireless feature classes for the current and previous versions of the NTIA SBDD Transfer database. The user needs to supply the feature classes for each NTIA version as well as the name of the final change detection table. NTIA_Change_Detection_Example.xls, compares and reports any changes (limited to Provider Name, DBA Name, FRN, TOT combinations) in the Census Block, Road Segment, and Wireless feature classes for the current and previous versions of the NTIA SBDD Transfer database. If the final change detection table has no records, then no changes were detected between the two databases. If a Provider Name, DBA Name, FRN, TOT combination does not have a "pair" in either direction (the current or previous NTIA database) then it is written to a geodatabase table along with the NTIA feature class and version where the "error" occurred. This report does not change any data in either database but rather acts as a flag, requiring an analyst to check if the "error" is valid.
    c. Check for duplicate census blocks or road segments or wireless coverage areas.
    d. Check for duplicate anchor institution points.

8. Review Final NTIA deliverables [Review by an analyst that did not process the original data]
    a. Review BB_ConnectionPoint_MiddleMile
    b. Review BB_Service_CAInstitutions
    c. Review BB_Service_Census Block
    d. Review BB_Service_Overview

e. Review BB_Service_RoadSegment
f. Review BB_Service_Wireless

9. Run the NTIA Check submission tool and python tool to confirm that all possible records passed the NTIA data checks. The only items that failed in the checking process were those where inconsistencies in the final NTIA NSGIC data model did not agree with the final documentation and rules established by NTIA and FCC in the final webinar and documentation presented March 17, 2011. These exceptions were documented along with the submission.

Appendix A

Potential providers researched but subsequently identified as not providing broadband service.

Company Name	Filing Company DBA	FRN	URL
5LINX Enterprises Inc. dba Globalinx	5LINX Enterprises, Inc.	0015304645	5linx.com/products
8x8, Inc.	8x8, Inc.	0007099773	www.8x8.com
Ablaze Technologies			none
ACN Communication Services, Inc.	ACN Communication Services, Inc.		www.myacn.com/index.html
Alltel Wireless	Alltel Wireless		na
American Fiber Network, Inc.	MobilePro Corp.	0006801583	none
AT&T Corp.	AT&T Inc.	0004496774	www.att.com
AxisInternet, Inc.	AxisInternet, Inc.	0019609254	www.axint.net
Badlands Cellular of North Dakota Cellular Partnership	Verizon Communications Inc.	0018535716	none
Bandwidth.com, Inc.	Bandwidth.com, Inc.	0015443773	bandwidth.com
BroadvoxGo!, LLC	BroadvoxGo!, LLC	0017679523	www.broadvox.com
Broadwing Communications, LLC	Level 3 Communications, LLC	0008599706	www.level3.com
BullsEye Telecom, Inc.	BullsEye Telecom, Inc.	0004350930	www.bullseyetelecom.com
Call Catchers Inc.	Call Catchers Inc.	0016109803	none
Callsmart	Callsmart		http://www.getcallsmart.com/
Cause Based Commerce Incorporated	Cause Based Commerce Incorporated	0015173503	causebasedcommerce.com
CierraCom Systems	CierraCom Systems		www.cierracom.com
Citizens Communications	Citizens Communications		none
CommPartners, LLC	CommPartners, LLC		www.commpartnersconnect.com
Consolidated Communications Networks, Inc.	Consolidated Telcom	0003740396	www.ctctel.com
Covad Communications Company	Covad Communications Company		www.covad.com/
CrossConnect	CrossConnect		www.crossconnectsolutions.com/
CVC CLEC, LLC	CVC CLEC, LLC		www.cvcclec.com
Cypress Communications, Inc.	Cypress Communications, Inc.	0005038930	cypresscom.net
Daktel Communications, LLC	Dakota Central Telecommunications	0007266703	www.daktel.com

	Cooperative		
DIECA Communications, Inc.	DIECA Communications, Inc.		www.covad.com
Digital Telecommunications, Inc.	Digital Telecommunications, Inc.		digitaltel.com
DSLnet Communications, LLC	DSLnet Communications, LLC		www.megapath.com
Enventis Telecom Inc.	Hickory Tech Corporation	0008394322	www.enventis.com
Ernest Communications, Inc.	Ernest Communications, Inc.	0004948642	www.ernestgroup.com
Ethos Communications Group, Inc.	Ethos Communications Group, Inc.		www.ethoscommunications.net
Exit Mobile	Exit Mobile		www.exitmobile.com
Faith Communications, Inc.	Faith Communications, Inc.		www.faith-inc.com
First Communications, LLC	First Communications, LLC	0003764487	www.firstcommunications.org
France Telecom Corporate Solutions L.L.C.	France Telecom Corporate Solutions L.L.C.		www.francetelecom.com
Frontier Informatics LLC	Frontier Informatics LLC		www.frontiertelco.com
Frontier Telco	Frontier Telco		www.frontiertelco.com
Global Crossing Telecommunications, Inc.	Global Crossing North America, Inc.	0002850519	www.globalcrossing.com
Grand Forks Wireless	Grand Forks Wireless		www.grandforkswireless.com
Granite Telecommunications LLC	Granite Telecommunications LLC	0008676975	www.granitenet.com
Great Western Network	Great Western Network		www.greatwesternnetwork.com
GreatCall, Inc.	GreatCall, Inc.	0018554386	www.greatcall.com
Greenfly Networks, Inc.	Greenfly Networks, Inc.	0015808736	www.clearfly.net
Harris Corporation	Harris Corporation		www.harris.com
Hypercube Telecom, LLC	Hypercube Telecom, LLC		www.h3net.com
iCore Networks, Inc.	iCore Networks, Inc.	0015340326	www.icore.com
InPhonex.com, LLC	InPhonex.com, LLC	0010488351	www.inphonex.com
Integra Telecom of North Dakota, Inc.	Integra Telecom Holdings, Inc.	0005071014	www.integratelecom.com
Ionex Communications North, Inc.	Birch Communications Inc.	0005027305	www.birch.com/about/
IP Networked Services, Inc.	IP Networked Services, Inc.	0016088882	none
KDDI America, Inc.	KDDI America, Inc.		www.kdd.com

Kentucky Data Link, Inc.	Kentucky Data Link, Inc.		www.kdlinc.com
Kotana Communications, Inc.	Kotana Communications, Inc.		kotana.com
Level 3 Communications, LLC	Level 3 Communications, LLC	0003723822	www.Level3.com
LightEdge Solutions, Inc.	LightEdge Solutions, Inc.	0015546443	www.lightedge.com
LightSquared LP	LightSquared LP	0007705742	www.lightsquared.com
Lightyear Network Solutions, LLC	Lightyear Network Solutions, LLC		www.lightyear.net
Loretel Systems, Inc.	Hector Communications Corporation	0002650828	www.loretel.com
Matrix Telecom, Inc.	Matrix Telecom, Inc.	0004333068	www.matrixbt.com
MCImetro Access Transmission Services LLC	MCImetro Access Transmission Services LLC		www.verizon.com
McKenzie Consolidated Telcom, LLC	McKenzie Consolidated Telcom, LLC		none
McLeodUSA Telecommunications Services, Inc.	PaeTec Corporation	0003716073	www.mcleodusa.com
Metropolitan Telecommunications of North Dakota, Inc.	Metropolitan Telecommunications Holding Company	0009806019	www.mettel.net
Millicorp	Millicorp	0018930511	www.millicorp.com
Missouri Valley Communications, Inc.	Nemont Telephone Cooperative, Inc.	0008326787	www.nemont.net
Mix Networks, Inc.	Mix Networks, Inc.	0014166573	www.mixnetworks.com
Mobile ESPN, LLC	Mobile ESPN, LLC		www.espn.com
NB Internet LLC	NB Internet LLC		www.nbinternet.com/
Network Innovations, Inc.	Network Innovations, Inc.		www.nitelecom.com
Neutral Tandem-North Dakota, LLC	Neutral Tandem-North Dakota, LLC		www.neutraltandem.com
New Edge Network, Inc.	New Edge Holding Company	0003720471	www.newedgenetworks.com
nexVortex,Inc.	nexVortex,Inc.	0015282155	www.nexvortex.com
Noonan Farmers Tel Co	Noonan Farmers Tel Co		
Norlight Telecommunications, Inc.	Norlight Telecommunications, Inc.		www.norlight.com
Norlight, Inc.	Norlight, Inc.		www.norlight.com
Northern Red River ITV	Northern Red River ITV		www.nrritv.k12.nd.us
Northstar Telecom, Inc.	Midwest Marketing	0011412905	www.northstartelecom.us

	Group, Inc.		
NOSVA Limited Partnership	NOSVA Limited Partnership		nosva.com
OnWav, Inc	OnWav, Inc	0018007898	www.onwav.com/home
PAETEC Communications	PAETEC Communications		www.paetec.com
Phone.com, LLC	Phone.com, LLC	0016845190	www.phone.com
PNG Telecommunications, Inc.	PNG Telecommunications, Inc.		www.powernetglobal.com
PowerNet Global Communications	PowerNet Global Communications		www.powernetglobal.com
Proximiti Technologies, Inc.	Proximiti Technologies, Inc.	0016431603	www.proximiti.com/default.aspx
Qwest Communications Company, LLC	Qwest Communications International, Inc.	0003605953	centurylink.com
Qwest Corporation	Qwest Corporation		centurylink.com
RNK, Inc.	Wave2Wave Communications, Inc.	0004343737	www.wave2wave.com
Rural Cellular Corp. DBA RCC Network Inc	Rural Cellular Corp. DBA RCC Network Inc		www.unicel.com
Sage Telecom, Inc.	Sage Telecom, Inc.		www.sagetelecom.net
Sagebrush Cellular, Inc.	Nemont Telephone Cooperative, Inc.	0001608645	www.nemont.net
SDN Communications	SDN Communications		www.sdncommunications.com
Skycasters LLC	Skycasters LLC	0018756155	www.skycasters.com
Skyland Technologies, Inc.	Skyland Technologies, Inc.		none
Smartnet, Inc.	Smartnet, Inc.		www.getcallsmart.com
South Dakota Network, LLC	South Dakota Network, LLC		www.sdncommunications.com
TDS Telecommunications Corporation	Telephone and Data Systems, Inc.	0004948105	www.teldta.com
TeleCommunication Systems Corporation of Maryland	TeleCommunication Systems Corporation of Maryland		www.telecomsys.com
Telesphere Networks Ltd.	Telesphere Networks Ltd.	0015328032	www.telesphere.com
The Neighborhood, Built by MCI	The Neighborhood, Built by MCI		www.verizon.com
Time-Warner	Time-Warner		www.timewarner.com
T-Mobile	T-Mobile		www.t-mobile.com
Trans National Communications	Trans National Communications	0004337846	www.tncii.com

International, Inc.	International, Inc.		
Trinsic Communications, Inc.	Trinsic Communications, Inc.		www.matrixbt.com
tw telecom holdings inc.	tw telecom inc.	0014942668	www.twtelecom.com
U.S. Link, Inc.	U.S. Link, Inc.		www.tdstelecom.com
UC	UC		www.integratelecom.com
Venture Communications Cooperative, Inc.	Venture Communications Cooperative, Inc.		www.venturecomm.net
Venture Communications Cooperative, Inc.	Venture Communications Cooperative, Inc./Western T	0003784477	www.venturecomm.net
verizon business global llc dba verizon business	Verizon Communications Inc.	0010856284	www.verizon.com
Vision Systems	Vision Systems		www.vision-systems.com
VoIP360, Inc.	VoIP360, Inc.	0016868317	none
VoIPStreet, Inc.	VoIPStreet, Inc.	0016266157	www.voipstreet.com
Vonage Holdings Corp.	Vonage Holdings Corp.	0018401844	www.vonage.com
WDIG Mobile, LLC	WDIG Mobile, LLC		www.dig.com
Western CLEC Corporation	Western CLEC Corporation		none
Western Wireless Corporation	Western Wireless Corporation		none
Wherify Wireless, Inc.	Wherify Wireless, Inc.		none
Wireless Alliance LLC	Wireless Alliance LLC		none
WWC Holding Co. - Cellular One (Western Wireless)	WWC Holding Co. - Cellular One (Western Wireless)		none
XE Mobile 55, LLC	XE Mobile 55, LLC		www.xemobile.com
YMAX Communications Corp.	YMAX Communications Corp.		www.ymaxcorp.com

UNIVERSITY of NEW HAMPSHIRE

New Hampshire Broadband Mapping and Planning Program
University of New Hampshire
Methodology Paper
April 2013 Data Submission

I. Data Description

In accordance with the effective NTIA guidance for Round 7 data submissions, the New Hampshire Broadband Mapping and Planning Program (NHBMPP) submitted the data set described below and associated documents to NTIA in April of 2013.

NH_SBDD_2013_04_01.gdb – file geodatabase containing feature classes for:

Feature Class	Number of Records
BB_ConnectionPoint_LastMile	0
BB_ConnectionPoint_MiddleMile	117
BB_Service_Address	54
BB_Service_CAInstitutions	4067
BB_Service_CensusBlock	105,016
BB_Service_Overview	0
BB_Service_RoadSegment	46,950
BB_Service_Wireless	49
State_Boundary	1

In total, over 156,250 individual data records on broadband availability were submitted by New Hampshire. Collectively, these records describe availability as reported by 40 broadband providers in the state, which represents an addition of one wireless provider over our prior submission. In addition, the NHBMPP submitted data on 4,067 community anchor institutions, an increase of over 160 records from the prior submission.

To achieve this level of reporting, the NHBMPP relied on a number of sources to identify potential providers in the state. The following table details the disposition of the initial set of providers:

Description	Number of Records
Potential providers identified in NH	93
Providers confirmed as delivering service in NH	63
Providers represented in the NHBMPP submission	40

II. Provider Participation

The NHBMPP has identified 63 broadband providers in the state. As noted above, 40 of these providers actively participated in the program for the Spring 2013 cycle. This number represents an increase of one provider from our prior submission – a national terrestrial wireless provider was just identified.

The 40 current participating providers include:

Provider Name	Technology
1. Argent Communications, LLC**	Fixed Wireless
2. AT&T Mobility LLC	Mobile Wireless
3. Charter Communications Inc.	Cable
4. ClearWire	Mobile Wireless
5. Comcast Cable Communications, LLC	Cable
6. Cyberpine Cooperative, Inc.*	Fixed Wireless
7. DSCI Corporation*	Middle Mile
8. Dunbarton Telephone Company, Inc.*	DSL
9. FairPoint Communications, Inc.	DSL
10. Freedom Ring Communications, LLC (dba BayRing Communications)**	Middle Mile
11. G4 Communications**	DSL, Middle Mile
12. Granite State Communications (aka Granite State Telephone)	DSL, Fiber
13. Great Auk Wireless (dba GAW High-Speed Internet Inc.)**	Fixed Wireless
14. GWI (aka Biddeford Internet Corporation)	DSL, Other Copper Wireline
15. HughesNet**	Satellite
16. IAMNOW.net*	Fixed Wireless
17. Lakes Region Wireless**	Fixed Wireless
18. Level 3 Communications	Fiber, Middle Mile
19. Lightower Fiber Networks*	Middle Mile
20. MegaPath (fka Covad Communications Company)	DSL, Other Copper Wireline, Middle Mile
21. MetroCast	Cable
22. OTT Communications	DSL, Middle Mile
23. Oxford Networks*	Middle Mile
24. Sidera Networks, LLC**	Middle Mile
25. Skycasters*	Satellite
26. Sovernet Communications*	DSL
27. Spectra Access*	Fixed Wireless
28. Sprint	Mobile Wireless
29. StarBand Communications, Inc.**	Satellite
30. Tamworth Wireless Cooperative**	Fixed Wireless
31. TDS Telecom	DSL, Fiber, Middle Mile
32. Time Warner Cable	Cable

33. T-Mobile	Mobile Wireless
34. Topsham Communications*	Fiber
35. U.S. Cellular	Mobile Wireless
36. Verizon Wireless	Mobile Wireless
37. ViaSat (fka WildBlue Communications, Inc.)	Satellite
38. Wave Comm, LLC*	Fixed Wireless
39. Wireless LINC of NH and VT (fka NCIC)**	Fixed Wireless
40. WiValley	Fixed Wireless

* Provider confirmed that coverage has not changed since October, 2012. and therefore did not submit revised data for this round.

** Provider did not confirm or submit revised data for Spring, 2013 submission. Data from previous round is being resubmitted.

The following 21 providers have remained unresponsive to multiple and ongoing requests to participate in the NHBMPP, have indicated that they will not participate or have dropped out of the program after initially providing data.

Provider Name	
1. Boston Telephone	2. Broadview Networks***
3. CityVoice	4. DESTEK
5. EarthLink Business (aka One Communications)	6. Fibercast Cable Communications
7. The Granite Connection	8. Grolen Communications
9. ITLLC (f/k/a Russet Communications)	10. Met Tel
11. MV Communications	12. NCIA
13. NHvt	14. Qwest Communications
15. RadiusNorth	16. segTel, Inc.
17. SkyWire Wifi (f/k/a Akers Pond)	18. TelJet***
19. Turnpike Technologies	20. USAi.net
21. WindStream	

*** Provider formally indicated that they will not be participating in the program.

The following 2 providers have been identified as providing internet service, but the maximum download and upload speeds they currently offer do not meet the broadband definition.

Provider Name	
1. Bretton Woods Telephone	2. Dixville Telephone

The 7 providers listed below were identified from analysis of the FCC Form 477 data (filings through February, 2011). The NHBMPP has contacted these providers, but to this date they have either been unresponsive or data has not been received so we cannot confirm their status in NH.

Provider Name	
1. Airespring, Inc.	2. BurgNet
3. Global Crossing North America, Inc.	4. Hickory Tech
5. NewEdge Network, Inc.	6. NextWave Wireless, Inc.
7. Telovations, Inc.	

Finally, the NHBMPP identified a number of providers during previous rounds that we no longer maintain on the active list because they have either ceased providing service, have merged with other providers, or were never an active provider in NH.

Provider Name	
1. Access Communications	2. All Media, Inc.
3. Alterracom Networks	4. BIT-NET
5. CheshireNet	6. Cogent
7. Cooperative Resources	8. Equal Access Networks
9. FCG Networks	10. Finowen
11. First Bridge	12. GreenNet
13. Green Wave Wireless	14. JLC
15. LevelOne Communications	16. Mainstream EIS
17. Mason Coop	18. RNK Communications
19. TTLC.net	20. Vermont Telephone
21. WaveGuide	22. Wireless Horizon
23. Worldpath	

The initial master list of providers was extracted from the "New Hampshire Broadband Action Plan", 2008, NH Telecommunications Advisory Board (TAB) and NH Department of Resources and Economic Development (DRED). This listing was cross-referenced against a statewide cell tower inventory maintained by the NH Office of Energy and Planning. NHBMPP staff maintains an ongoing effort to identify additional active service providers in the state based on continuing interactions with TAB and DRED, review of speed test results, updated FCC data when published, and other sources as available.

III. Data Collection and Integration

A. Primary Data Collection

Data Acquisition

Primary data was collected directly from the service providers. The NHBMPP first developed a set of guidance documents based on NTIA specifications, and distributed those to the individual providers. Once the guidance was disseminated, NHBMPP staff followed up with providers via phone/email to encourage participation and address questions, as required. Typically, multiple communications were required to ensure a complete data submission was received.

Data Pre-Processing

To support the data mapping and integration efforts, the following base data sets were acquired and/or retrieved from the NH GRANIT state GIS clearinghouse archives:

- State and town boundaries (based on 1:24,000 USGS DLG files);
- 2001 Land Cover data set (derived from Landsat TM imagery);
- 2010 TIGER Census Blocks;
- 2010 Census MAF/TIGER Road Segments; and
- 2009 USGS National Elevation Data set (NED).

All required NTIA fields were added to the census block and road segment data sets. In addition, the road segments were processed against the census blocks to populate two fields used internally – the left block ID and the right block ID associated with each road segment.

Data Processing and Integration

The broadband availability data was processed and integrated using a suite of GIS tools and procedures, depending upon the format and content of the data submitted by the individual providers. Generally, the processing involved executing one or more of the following steps:

- Scanning and georeferencing paper maps and using the results as a visual reference to select out corresponding features from the project base data sets.
- Geocoding addresses using both an internal locator based on the TIGER road segments, and where required, the ESRI TA_BatchAddress_US subscription service; where NDAs were in place, geocoded points were then used to identify the host census block (if <= 2 sq. mi.), or the TIGER road segment in closest proximity but within 500' (if the host census block was > 2 sq. mi.). Related note(s):
  - In some cases, the selection of the TIGER road segment in closest proximity to the geocoded point yielded a pattern of disconnected road segments with broadband service.
- Using ArcGIS Network Analyst to select road segments within a cumulative distance of 3,000 and/or 18,000 lineal feet from central office locations, depending upon data submitted by the provider. The selected segments were subsequently used to identify adjacent census blocks <= 2 sq. mi. or used as features to quantify coverage along census blocks > 2 sq. mi. Note that in previous rounds, adjacent census blocks were flagged based on road segments intersecting those blocks. In this round, we refined our approach to define adjacency as blocks sharing a boundary with the road segment. This more conservative approach resulted in some blocks dropping out of provider coverage footprints.
- Processing KMZ image files, using the bounding rectangle to establish interior georeferencing, and then converting the georeferenced image to polygons.
- Utilizing Cellular Expert ArcGIS extension to generate a signal prediction surface for wireless providers submitting antenna locations (and associated data). Related note(s):
  - The statewide cell tower inventory provided the starting point for the signal propagation modeling efforts.
  - Subsequently, working with UNC-Raleigh and a NH-based fixed-wireless provider, the data processing models were refined to take into consideration visibility parameters (in addition to vegetation and topography).
  - During the current processing round, program staff participated in additional Cellular Expert training sessions to further enhance the signal propagation

models. As a result, some provider coverage footprints have been reduced from previous submissions.
    - A -90 DB threshhold was used to define service areas of fixed-wireless providers.
    - In processing the fixed-wireless polygon data, exterior polygons, e.g. those outside of the main coverage footprint, that were < .125 sq. mi. were eliminated. Interior non-coverage polygons were not eliminated.
- Processing satellite coverage footprints to incorporate the Utah shadow analysis (as posted on PBWorks).

The NHBMPP maintains a record of all specific processing steps applied to each provider's data submission in each round. We review that methodology with each provider as part of the verification process to ensure appropriate processing steps are followed.

Data Processing Issues

The NHBMPP encountered a number of issues in processing the broadband data for the state. These include:

- Most providers submitted data only on areas that are currently served, and not on areas that could be served following the NTIA guidance. This contributed to the pattern of occasional disconnected rural road segments with broadband service.
- Reliance on the TIGER road segments likely yielded overstated broadband coverage in rural areas. A single rural customer address, when geocoded, could result in a long street segment being selected as part of a provider's coverage area.
- Most providers did not submit typical speed data. As the volume of our speed test data set grows, we will explore using this information to estimate typical speeds.
- Fixed wireless providers frequently did not deliver the full set of antenna parameters required for the signal propagation software, and required multiple requests for data followed by requests for clarification of those data submitted. While new submissions this round were more complete than in previous rounds, this remains an issue.
- Providers who are knowledgeable and experienced with the original 2009 NTIA NOFA and corresponding clarification documentation provided information appropriate to that data schema / model, and modifications to these in June 2011 resulted in additional follow-up required to achieve a complete data submission.
- As a result of reprocessing data to incorporate enhanced methodologies, there are some instances of reduced provider footprints being reported.
- For providers who submitted address records, the first process was to geocode those addresses to the 2010 TIGER road segments. For any ungeocoded addresses, the program next utilized ESRI's online geocoding services. Any remaining, ungeocoded records were geocoded manually using Bing. In some instances, records continued to remain uncoded after this three-phase approach. We have identified a number of issues with some of the resulting geocoded data:
    - In reviewing addresses geocoded against ESRI services, we discovered a small number of records that did not appear to be correctly positioned. The incorrect positioning was confirmed by viewing the geocoded points relative to both TIGER road data and by referencing Bing. In some instances, the geocoded

points were positioned a significant distance away from any mapped road segment. A proximity analysis with a 500' distance constraint was used to identify the closest road in these instances.
    - Finally, some geocoded results were mapped in a town other than the town identified by the provider in their address records. In most instances the geocoded result was to a neighboring town and was within .1 miles of the recorded town. The NHBMPP retained the geocoded locations and notified the provider of these discrepancies.
- For speeds reported by providers in ranges, e.g. 4G LTE, the speed tier reported was selected to include the upper end of the range.
- Some fixed wireless providers continue to report minimum download speeds < 768 kbps, e.g. outside of the NTIA domain, but maximum download speeds within NTIA speed tier domain values. In these instances, the NHBMPP reported the data based on the maximum speed reported.

B. Community Anchor Institutions

Data was submitted for 4,067 Community Anchor Institutions (CAIs) in the state covering the full range of categories established by NTIA, as follows:

Category	Number of CAIs	Percent of Total
1. School – K through 12	764	18.8%
2. Library	793	19.5%
3. Medical/health care	946	23.3%
4. Public safety	566	13.9%
5. University, college, other post-secondary	64	1.6%
6. Other community support – government	735	18.1%
7. Other community support – non governmental	199	4.9%
TOTAL	4,067	100.0%

This submission represents an increase of 168 CAIs over the prior data set. Most of the growth was in the medical/health care category, which grew from 808 records in the Fall of 2012 to 946 records in the current data set.

In previous rounds, the CAI data set included a single record for health care facilities that held multiple licenses, e.g. a retirement community providing in-home care, rehabilitation services and a nursing home. However, the NH Department of Health and Human Services has requested that we introduce one record for each facility license type to assist them in meeting their federal reporting requirements. This protocol resulted in a significant increase in the number of health care records in the CAI database.

In this data collection and maintenance round, the collection was largely accomplished by the individual community anchor institutions via the project's CAI web portal. The nine regional planning commissions in New Hampshire provided regional technical support, with the Upper Valley Lake Sunapee Regional Planning Commission (UVLSRPC) & NHBMPP staff at the University responsible for developing guidance, for overseeing collection, and for compiling the resulting

regional data sets into a standardized statewide layer. The primary steps in the process included:

- Issue initial and reminder emails to existing CAI contacts, requesting that they review/update their record(s);
- For round 7, prioritize municipal CAI's and follow up with those who remained unresponsive;
- Develop a master list of CAIs by category that were not inventoried in previous rounds through review of updated statewide lists (schools, libraries, health care facilities), existing GIS data sets (largely from local hazard mitigation plans), and local knowledge;
- Review updated statewide lists of healthcare facilities, schools and libraries to identify newly opened facilities and those which have closed;
- Develop list of institutions which have multiple healthcare facilities within the single institution
- Develop a list of previously identified CAIs with incomplete broadband information focusing on municipalities;
- Contact those entities to collect their broadband details using an email outreach methodology, as well as phone surveys;
- Map the location of each unmapped CAI, using existing GIS data sets, reference to aerial imagery, property boundaries, web research, and field data collection where necessary;
- Verify data (see verification section below).

IV. Validation

A. Primary Data Collection

The NHBMPP utilized multiple processes to verify the broadband provider data collected during the current round. These processes, each of which is described further below, included:

- Internal verification
- Provider verification
- Ground infrastructure checks
- Use of orthophotography
- Use of parcel data
- Use of FCC filing data
- Crowdsourced data – including speed tests and surveys
- Satellite dish inventory

First, the NHBMPP continued to use local knowledge to conduct an internal analysis of the reasonableness and consistency of our mapping results. Significant overstatements or understatements of service areas resulting from internal processing issues were readily identified and addressed. The NHBMPP also verified the "reasonableness" of data by comparing current coverage footprints to those reported during the prior round. This allowed us to identify areas where service areas changed substantively, and to communicate these findings to the provider for verification.

Secondly, the Spring, 2013 feedback loop with providers was more robust than prior rounds, largely due to increased effort on the part of program staff to solicit comment and the strong relationship now established between the providers and program staff. This round's efforts engaged all providers, including those who did not submit new data but whose prior data was reprocessed according to newer guidelines (described above). The NHBMPP returned maps (.pdf files) to each provider for review and correction. Where providers delivered addresses or road segments, the product returned was a geographically referenced version of the data that was submitted. For wireless providers who delivered antenna locations and specifications, the program provided maps that displayed the modeled coverage area generated from the Cellular Expert signal propagation modeling software. Some providers requested the data verification information be provided in shapefile and/or Google Earth (.kmz) format. Additionally, the NHBMPP created a secure interactive mapping verification website for the five providers whose service areas cover a majority of the state. Our experience was that the web-based solution was not fully utilized, likely due to limited provider staff resources. Overall, the provider verifications yielded a number of requests for modifications, all of which are represented in the data submission.

Orthophotography was utilized to support a number of mapping activities. Among other applications, it assisted in verifying tower locations and mapping results for the wireless signal propagation modeling, was used as an important reference layer in the verification maps delivered to providers, and contributed extensively to the mapping and verification of Community Anchor Institutions.

Community Anchor Institution mapping was supported by two other substantive data sets – parcel data and "community destination" data. The parcel data was used to map and/or verify locations. (Note that it also was used to assist in verifying the positional accuracy of address data submitted by providers.) The statewide community destinations inventory served as a starting point for compiling and mapping municipal facilities.

The NHBMPP utilized FCC Form 477 filings to support the verification of provider coverage areas. Analysis of tracts reported as being served by each provider against those developed from the provider's submission allowed for verification and validation of service areas. There were some instances where a provider's FCC report indicated a greater footprint than indicated by their data submission, and this information was relayed back to the provider during the data review period.

Other verification measures included:

- Speed test – The NHBMPP program has posted a customized speed test on the project web site (iwantbroadbandnh.org). To date, over 6,500 have been submitted. We have processed those data to map the locations from which the tests were conducted and to summarize the test results. Through further analysis of the speed tests focusing on reported providers, the program will compare the service identified to the provider's reported coverage area to ensure there are not areas unreported, and/or areas where speed test results represent a significant deviation from the reported speed tier.

- Broadband survey – The NHBMPP website also hosts an online broadband survey, encouraging users to report their broadband access (or lack thereof) at the address level. The address submitted is then geocoded, which delivers a means of verifying provider coverage data at specific locations. (The survey is also linked to the speed test, so that users completing the form are asked to take the speed test as well.) To date, 568 surveys have been completed.

- Satellite dish survey – The NHBMPP has completed a drive-by inventory of satellite dishes in selected rural areas of the state, under the premise that a cluster of buildings with satellite broadband dishes signifies an area with no other broadband options available. This information has been utilized as part of the internal data review cycle.

- Cellular Drive Testing – The NHBMPP has completed a mobile wireless drive test to identify the areas of New Hampshire that are lacking mobile wireless data coverage. The 5 mobile wireless providers (AT&T, Sprint, T-Mobile, US Cellular, and Verizon Wireless) have provided the NHBMPP with polygon shapefiles of their coverage in an aggregate for the state. It is recognized through personal experience, community emails, and online surveys that these data overstate the actual service coverage. The drive test results are being used to review, verify and enhance the coverage information submitted by the providers.

B. Community Anchor Institutions

The CAI data has been subjected to several rounds of verification during this and previous data submission cycles. An initial round of verification was completed in May, 2010 by re-interviewing a randomly selected subset of CAI contacts (20% of the entities within each of the 7 data categories). Later verification rounds were accomplished by generating a broadband profile sheet for each CAI, emailing that to each CAI contact for review, and modifying the CAI record based on any updates returned.

As of March, 2012, we created an interface for CAI contacts to review and modify their individual records via the NHBMPP website. We continued to leverage the use of these web technologies during the current reporting period, and received over 700 updates via the website for the round 7 submission.

Overall, the completeness of the data set improved over the previous submission in two specific areas:

- The percent of CAIs that reviewed and updated their broadband information via the website increased from 8% to 18%; and
- The number of records with data on technology of transmission improved by nearly 2%.

New Jersey Broadband Mapping Project:

Methodology Report on Data Integration and Validation Procedures for April 2013 Submission

March 29, 2013

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Table of Contents

1 Data Processing: Collection, Reception, Loading, Validation

This document describes the process used by the New Jersey Office of Information Technology (OIT) and Applied Communication Sciences to collect, receive, load, validate and verify broadband availability and usage data submitted to us by wireless and wireline service providers, CAIs, and other sources and organizations in the State of New Jersey. Individual provider data reports attached hereto provide details on the processing of each provider's submission and explain how the policies presented in this document were applied to the data. The CAI summary report, also attached, provides details on the CAI data processing, including the implementation of additional validation rules on CAI data. This report also describes some of the complexities and challenges we have encountered to date in this project.

1.1 *Structure of this Report*

This methodology report consists of the following:

- Section 2 summarizes our *Data Outreach* efforts to collect data
  - This section also describes some of the challenges in determining what service providers are in and out of scope for this work and our approach to service provider categorization, in addition to summarizing our efforts to engage CAI constituencies
- Section 3 provides an overview of our process for *Service Provider Data Reception*
- Section 4 provides an overview of our process for *Service Provider Data Loading*
- Section 5 provides an overview of our process for *Data Validation and Verification*
  - This section includes a table of business rules and how they were implemented.
- Section 6 describes our *Handling of Special Cases*, including verification procedure, validation warnings and handling of fixed wireless providers
- Appendix A: NJ Provider Data Reports
  - This appendix concatenates 32 files, one file for each provider whose data were included in the submission. Each report provides a narrative describing the steps involved in collecting, verifying, loading, and validating the provider data, including a log of the interactions with the provider.
- Appendix B: CAI Data Processing Report
  - This is a summary of the details of the CAI processing for this submission.
- Appendix C: Third Party Comparisons
  - This summarizes analysis of feedback received during the summer of 2012 from NTIA/Michael Baker based on their comparison of NJ June 2011 and Dec 2011data submissions with third-party data, and responses from them to questions raised by our analysis.

2 Data Outreach

2.1 *Provider Data Outreach*

Applied Communication Sciences and NJ-OIT have conducted further outreach to identify additional potential providers not previously participating. In this round, we particularly focused on getting responses from previously "nonresponsive" or "uncooperative" providers known to provide service in neighboring states who have previously submitted data for other states to the NTIA, e.g., Windstream Corp. and Zayo LLC. When contacting these providers, we described the potential benefits of participation and included instructions on data requirements, including how to submit via our custom-designed Web site found at http://connectingnj.state.nj.us/. Note that for some providers in this category we have reason to believe they do provide service in NJ (e.g., Zayo's website shows lit metro and long-haul fiber in NJ). For others, it appears that they may not offer service in NJ so we are trying to confirm

this and also find out if they have plans to enter the NJ market (e.g., Windstream does not list NJ as a state in which they operate on their website).

Most providers who had participated in the past were willing to participate again, although some small providers, e.g., Advanza, expressed concerns about the burdens of the data collection process. Several, listed below, opted not to provide data updates in this round. One provider, New Edge/Earthlink opted out again because of data accuracy concerns about their map data. The large national providers clearly have processes in place to collect and submit data, while the small local providers require greater assistance. Applied Communication Sciences offers assistance where possible, allowing providers to submit whatever data they have available in any convenient format. This increases the complexity of the data collection and processing operations, but enables greater coverage of providers. As examples, some smaller wireline providers simply submitted a list of addresses where they offer service and some small cable operators submitted the names of the municipalities they cover; another provided a copy of their most recent FCC Form 477.

- We contacted more than 39 organizations that were potential or known service providers, via email, postings to their Web site and/or telephone calls, broken down as follows:
    - 32 facilities-based providers who had contributed data in the Fall 2012 round;
    - 7 other service providers with FRNs to deliver broadband service in NJ and/or already deliver it to neighboring states (more on these below).

- We are submitting data for 32 providers. This list includes all of the 32 providers for whom we submitted data in the Fall 2012 round. Note that AT&T and Cablevision each provided data for two FRN's. :
    - 20 providers submitted data for this round.
    - 10 providers instructed us to use previously submitted data.
    - 2 providers failed to respond to repeated contact attempts via email and phone, but had submitted data during previous rounds. We elected to submit legacy data for these providers:
        - Appia Communications (formerly known as NetLogic/Voxitas)
        - Jersey Shore Wireless/Duxpond Communications. While they did not respond to our request, maps published on their website suggest that their service areas have not changed since the Fall 2012 submission.
- Among these 32 providers:
    - 7 reported offering wireless data services in NJ.
        - Clearwire
        - Global Online Electronic Services, Inc.
        - Jersey Shore Wireless/Duxpond Communications
        - Leap/Cricket
        - Sprint
        - T-Mobile
        - Verizon Wireless
    - In addition to the wireless service providers listed above, 4 reported offering satellite data services in NJ.
        - Hughes Network Systems
        - Skycasters, LLC
        - StarBand Communications
        - ViaSat, Inc.
    - 5 reported offering cable data services in NJ.
        - Comcast
        - CSC (Cablevision/Lightpath)

        - Service Electric of Hunterdon
        - Service Electric of Sparta
        - Time Warner
- Two of the 32 providers might be considered candidates for "setting-aside" in future submissions:
    - Tata only serves two small locations in NJ
    - Network Billing Systems only provides middle-mile service

- As with the Fall'12 submission, one known New Jersey provider indicated they no longer wished to submit data:
    - New Edge/OneCommunications/EarthLink responded with email saying they did not believe the data they had was complete or accurate enough for submission.

- We attempted to contact 7 additional organizations who have FRNs associated with New Jersey to try and determine if they are actually providing service in the state. We contacted these organizations via email, telephone and/or through postings on their Web sites. In addition, we reached out through our regional sharing group consisting of local states (PA, VA, MD, WV, DE, etc.) and through PBWORKS to obtain contacts at organizations that other nearby states are using. Of these, we had direct interactions with only two:
    - Broadview had no data to contribute.
    - Frontier Communications does not offer service in New Jersey.
    - Neither Fibertech Networks, LLC, Windstream Corp., Yellowspeed, nor Zayo Group, LLC ever responded, even though we tried Windstream and Zayo contacts recommended and used successfully by other NTIA grantees.
        - Fibertech has provided data for 5 other states, including New York, Pennsylvania and Connecticut; furthermore, their website states that they do serve communities in NJ.
        - Windstream has provided data for the District of Columbia and 22 other states, including New York and Pennsylvania; however, their website does not list NJ as a state in which they are operating; and
        - Zayo has provided data for 10 other states, the closest to New Jersey is Maryland; also, their website shows lit fiber in NJ.
        - The online phone number for Yellowspeed no longer seems to be in service.

- We have previously disqualified the following organizations for reasons stated below:
    - *Six companies that are not in business at this time:* FARIOUS.NET, Near You Networks, SeaWaves Technology, SuperNet WISP, WEBNJ.net, and Wave2Wave.
    - *Four companies that are not service providers:* American Telephone Company (sells equipment), MeTel Metropolitan Telecommunications (reseller), Reallinx (consulting group), and World Discount Telecommunications (reseller).
    - *Four companies not providing service in New Jersey:* Broadstar, Metrocast/Harron Communications, Sidera (formerly RCN), and Convergence Technologies.
    - *Three companies that provide service in New Jersey but cannot meet a 7-10 day service window:* Atlantech Online, Azirband Communications Holdings, and Global Crossing North America.
    - *None of the following ever responded to our requests:* Abry Partners, Airespring, Bandwave Systems, BCN Telecom, Broadcore, Cooperative Communications, Copper.net, CTI Networks, Everest Broadband Networks, eVolve/Cinncinati Bell, Hickory Tech Corporation/Enventis Telecom, Hotwire Communication, Interglobe, Lightower, Link Technologies, Natural Wireless, Reynwood Communications, Savvis,

SmartChoice, Stage 2 Networks, T2 Technologies, Tele-Data Solutions, TouchTone Communications, Towerstream, Transbeam, Vocal IP Networks, and VoicePulse.

- *The following were either unreachable or email was returned from their published addresses:* 1800HIGHSPEED.com, Data Network Solutions, EmbraceCORTEL Technologies, and MetroPCS Wireless.

2.1.1 Service Provider Classification

We have classified Service Providers into the four categories as follows:

Type 1 = Broadband
These are broadband providers that meet the NOFA definition of a facilities-based provider with a 7-10 service provision time frame.

Type 2 = Reseller
These are broadband providers who do not meet the NOFA definition of a facilities-based provider because they resell facilities that belong to another service provider.

Type 3= Other
These are broadband providers who are known not to be of Type 1 or Type 2. Typically this is either because they cannot meet the 7-10 day service provision time frame or because their service architecture is complex and is neither facilities-based nor a reseller.

Type 4 = N/A
We used this classification for providers who did not respond to our requests, because we did not have sufficient information to assign them to another class.

Since it is only Type 1 providers who are squarely in scope for this program, these are the only ones for whom we have ensured that the NDA, provider_ind and submit_ind columns in the service_provider_info spreadsheet are completed. Our rationale for this is the following -- we would not want to categorize a non-Type-1 organization as "will not provide data" or "non-responsive" under provider_ind, as this may appear pejorative.

In our ongoing efforts to reach out to the full set of broadband service providers in New Jersey, we work to identify potential providers and screen them to determine if they are providing or reselling broadband services in the state. We maintain a commented list of those organizations that we have determined not to be New Jersey broadband providers or resellers and of those organizations that remain under investigation. Some of these organizations are no longer active business concerns; some are no longer independent organizations, but have been acquired by other entities; some offer or resell broadband service in other locations but not in New Jersey; some are companies that provide engineering or consulting support around broadband, but do not provide or resell service; and some are firms for which further interaction is needed to definitely determine their situation.

2.2 *CAI Data Outreach*

Applied Communication Sciences and OIT used a variety of means to collect Community Anchor institution data. We updated our reference data for healthcare and universities and we obtained new broadband data on libraries. We offered our website for individual institutions to enter broadband data, but there was no new activity during this round.

For healthcare institutions we used as the reference list an updated list of hospitals, pharmacies and clinical laboratories to which we added long term care facilities. These were obtained from a combination of the NJ Department of Health, CDC, and other industry websites (e.g., Surescripts). We obtained a list of New Jersey libraries that connect to the JerseyConnect broadband service from the New Jersey State Library. In addition, we used the publicly available list of WiFi hotspots that are located in libraries to augment the broadband data for libraries.

For each CAI category, the following table provides the number of records we obtained from the reference source, the number of broadband access records we obtained, the total number of records we submitted to the NTIA and the number of complete records, with verified address information and broadband access information.

CAI Category	Reference Records	Broadband Records	Total Records Submitted	Complete Records Submitted
School K-12 (Public)	2686 (DOE)	2428 (DOE) 796 (Web)	3763	2466
School K-12 (Private)	1159 (NCES)			
Libraries	461 (IMLS)	89 (Web) 77 (NJ State Library) 102 (Public WiFi)	474	171
Medical/Healthcare	9349	5	9265	5
Public Safety	343 (NJ 911 Comm.)	120	341	80
University	160 (NCES IPEDS)	41 (NJEdge)	160	40
Other – State and Local Government		2007 (state gov't) 54 (Web)	1692	1692
Other – Non Government		8	8	8

Abbreviations and Acronyms:

911 Comm	New Jersey 9-1-1 Commission
IMLS	Institute of Museum and Library Services
IPEDS	Integrated Postsecondary Education Data System
NCES	National Center for Education Statistics
NJHA	New Jersey Hospital Association
NJ-DHHS	New Jersey Department of Health and Human Services

New Jersey has a strong tradition of home rule and, like many eastern states, a plethora of small governance entities – towns, townships, boroughs, cities, and other local municipalities. Among the major challenges we face in collecting broadband CAI data in the state are the dearth of strong, state-level organizations that might compel members to provide data (as opposed to comparatively weaker coordinating bodies) and the lack of existing broadband data sources. NJEdge's data on the higher education institutions to which they provide service and JerseyConnect's data on libraries to which they provide service are among the very few such resources in the state.

NJ OIT executives have worked through state-level contacts in public safety, education and libraries, etc., to encourage their constituencies to participate and submit data through the website. While some groups have been more responsive than others, many have expressed concerns about placing additional burdens in a time of shrinking budgets and cutbacks. We did not receive any additional data from the website in this round.

We have encountered a few issues with collection, interpretation and processing of CAI data:

- Some institutions provide information on multiple connections to the internet, each with its own technology of transmission and maximum speeds. These may represent separate redundant connections for a large institution that provides critical services or separate facilities for different

classes of users (e.g., staff and clients). Our policy thus far has been to submit a single entry for each institution, but this policy was changed in this round. We preserved the multiple connections in the final submission resulting in multiple records for such institutions. With a few exceptions, the multiple connections show up as unique records that can be differentiated based on technology or speed. .

- Satellite institutions such as branch libraries or campus outreach centers can complicate the CAI picture. Our policy is to attempt to collect data for each separate geographic location as a separate CAI.
- Sometimes multiple government offices are co-located in one geographic location; e.g., a large building or complex that may include county government offices, court, jail, and/or other government offices. Here the challenge is avoid incorrectly overstating broadband capability or understating the need for broadband services.
- It remains challenging to convince busy employees at CAIs to take the time to provide this data.
- The CAI transfer model requires a street number and for some CAIs this is not readily available as institutions may use a cross street for directions, a PO box for paper mail, etc. In some cases we are able to identify a valid address through web research.

3 Service Provider Data Reception

Applied Communication Sciences defined a process for handling provider data upon receipt. The following steps describe that process:

These steps must be performed upon receipt of provider data. These steps set up the file system and database for later processing, including both the initial assessment and load, and protect the confidentiality of the information.

1. Update the provider interaction log spreadsheet with the date of receipt and other metadata.
2. Copy the email or decrypt the uploaded files to individual directory on dedicated and secure server.
3. Test that the files can be opened, read, etc. This may require using ESRI ArcCatalog to check a shapefile or file geodatabase.
4. Send an acknowledgement to the provider of receipt of readable submission, or request re-send as needed.
5. Create empty provider data report into the new folder, using the appropriate wireless or wireline template**.**
6. Connect to the PostgreSQL database and instantiate a schema for the provider.
7. Perform an evaluation on the submitted data, evaluating the completeness of the submission and the validity and reasonableness of the included values. In addition, run the NTIA validations against the submitted data to determine if there are any errors or warnings. Interact with provider to address any questions or issues.

4 Service Provider Data Loading

The provider data submissions vary in form, format and content and in the ease versus complexity of the processing and loading tasks.

In general, the most straightforward data to process are shape files submitted by wireless providers. Wireline providers who submit census block data are a step up in terms of complexity. Some cable providers simply list the municipalities which they serve. A number of smaller providers submit a list of addresses corresponding to locations where they provide service. These are much more challenging to process as we must first manipulate the address information and then geocode the locations; these operations can be time consuming and subject to inaccuracies. In fact, due likely to algorithmic changes

made in online geocoding services that we use for this purpose, some of the geolocations we obtained for addresses in this Spring 2013 submission were judged less accurate than ones computed for the same addresses in previous rounds. In light of this, for this round we chose to relax the threshold on data quality values returned by these services. We intend to give this matter more attention going forward by (1) testing the same geolocation services again with the same data to determine whether different valuations might be the result of a bug, (2) employing multiple geolocation services in our processing flows and taking a "vote" on these, and (3) assessing the correlation between different online geolocation services. The service provider reports attached in Appendix A give the full details per provider on all steps taken to extract, transform, and load the contents of the provider tables into the NTIA tables. Note that every NTIA table has a "shape" column where a map object such as a point, line (e.g., road segment) or area (e.g., census block) must be submitted.

Here is a summary of some of our key policies and challenges:

- All non-disclosure agreements executed with providers prohibit us from disclosing customer addresses. Although some providers have not executed NDAs, we have chosen to treat all providers similarly. We have chosen to obfuscate the address data by transforming it to census blocks or street segments. This carries a slight risk of overstating coverage, but that seems more appropriate than simply dropping the data because it is sensitive. In addition we had one provider who sent us proprietary subscriber-weighted nominal speed data. Given the proprietary restrictions associated with these data, we did not include them in the submission.
- Speeds associated with address data from some providers represent the price plan chosen by the customer; they are definitely neither the max advertised speed nor the typical speed. Our decision was to keep the maximum speeds encountered in the census block and report them in the maximum advertised fields and to report typical as null.
- Maximum advertised speed, combined with the 7-10 day availability requirement, results in variable interpretations. In particular, the concept of advertised speed is well suited for providers who offer services to extended areas, such as large telephone and cable television companies. Its application is less clear for providers who offer service to defined set of specific addresses. They deliver services to those specific addresses, and could offer the same service to a new tenant within the time limit. In some cases, they could increase the speed within that time period as well. They could not easily deliver service to any neighboring location with a two-week period. We have operationalized the notion of maximum advertised speed by determining the maximum speed a provider could offer on the facilities they have in place at customer locations, and then reporting that speed for census blocks or street segments.
- After initial poor results in geo-coding the customer address lists provided by some cable providers who had no geospatial capabilities, we identified an alternate approach that leveraged the franchise-nature of cable television service in the state. We asked those cable TV providers to send us the list of municipalities that they are licensed to serve. We build the submission by locating the municipality shapes and using those shapes to find all census blocks contained within them. For large census blocks, we report all the Tiger/Line street segments that are contained within those blocks.
- For middle mile data, the exact definition of a connection point remains open to interpretation and requires further development. We are not completely sure that all providers interpret middle mile in the same fashion and do not have a clear enough picture ourselves to provide appropriate guidance or validation. Despite this, we have submitted the middle mile information that we received.
- All but one provider submitted 2010 Census Blocks (CBs). One satellite provider (Hughes) submitted data using 2000 CBs. Given that we had to convert this to a single shape, rather than map to Y2010 census blocks, this was not an issue.

5 Validation and Verification Operations

In addition to the usual V&V procedures we normally apply to each submission, as described below and previously reported, we typically provide additional feedback to service providers as preparation to a submission. Our first feedback was based on the NTIA/Michael Baker comparisons between our 2011 submissions and their third-party data (already reported with the Fall 2012 submission). For this Spring 2013 submission, we provided feedback to some service providers based on comparisons between our Fall 2012 NJ service provider data and CAI data; and other feedback based on our donut hole analysis of the Fall 2012 service provider data. In each case, service providers were informed of map discrepancies and encouraged to investigate these with the hope of improving the quality of their data in the Spring 2013 submission. More on this recent feedback is reported later in this section.

5.1 *Custom Data Verification and Validation*

Incoming data was subjected to a number of validation checks. When incoming data failed a validation check, we first investigated our process to ensure that we were not inadvertently creating an issue. If the problem was determined to be with the submitted data, we notified the provider concerned and recorded the interaction in the provider data report as provided in Appendix A.

We have observed a few issues that arose when processing the current submission:

- New Jersey placenames can be difficult. We validate against data from the following sources: State of New Jersey geographic information (https://njgin.state.nj.us/NJ_NJGINExplorer/DataDownloads.jsp), the Federal Government placename information (http://geonames.usgs.gov/domestic/download_data.htm), and the US Postal Service data (available for a fee).
- A survey of 3100 New Jersey households was conducted in November and December of 2010 by Rutgers University as Applied Communication Sciences' subcontractor under this program. Householders who responded that they were broadband users were asked who their service provider was and this was compared against service provider serving areas. 95% of the responses aligned with service provider information. In the remaining 63 cases, the survey respondents reported being served by a provider whose coverage area did not appear to cover that location. Through these cases we have identified an area for additional investigation which may lead to improvements in service provider coverage. The technique, based on geo-spatial analysis of neighboring CBs is briefly described in Section 6.2.
- T-Mobile submitted wireless coverage data that provided one of the more interesting validation issues. T-Mobile provided separate information about three different varieties of 3GPP-based wireless technology, each of which supports broadband data services through mobile terrestrial wireless service capability; namely: UMTS, HSPA21 (i.e., HSPA) and HSPA42 (i.e., HSPA+)[1]. In order to avoid duplicates – that is, rows of T-Mobile data with identical shapes and the same technology and spectrum codes, differing only in maximum speed, we performed spatial joins separately for each of UMTS, HSPA21 and HSPA42. We then submitted one shape for each technology.
- The End_User_Category for Census Blocks or Road Segments is an optional field for designating the geography as being primarily Residential, Non-Residential, or Other (primarily neither Residential nor Non-Residential). We have elected not to complete this field as we do not have a trusted data source for this information.

[1] Here are a few more technical details. UMTS is based upon 3GPP release 99 and is the oldest and slowest of the three varieties. HSPA (HSPA21) is 3GPP R6 which supports HSDPA and HSDPU for downlink and uplink high-speed packet access and offers intermediate speeds. HSPA+ (HSPA42) is 3GPP R7. It is the most advanced of the three and supports high-speed packet access evolution with peak data rate increases from MIMO and higher-order modulation, among other technical advances.

- We use Yahoo and Google online geolocation services to compute geographical coordinates for subscriber addresses. These geocodes are provided along with a quality rating for each. For some of the Spring 2013 data, we noticed that geocodes with lower ratings were provided for some of the same addresses we submitted in the past. We can only assume that there have been changes made to the data or algorithms used by Yahoo and Google to compute geolocations. The impact of this on the submission is a small reduction in the number of census blocks reported for some providers, e.g., Hometown Online, compared to previous submissions.
- Some of the street lines we received from data providers, e.g., Cablevision/Lightpath, were missing street names. We still included shapes bounded by these as part of a provider's service area, even though they cannot be associated with a Census Block.

We applied the business rules in the script supplied by the NTIA and other data-specific validations after the data were loaded into the tables. These were applied as a check on both the data supplied by the providers and on the process we used for data collections, reception and loading. Moreover, other business rules were applied above and beyond those in the NTIA script, as described below.

We checked uniqueness of the entries in each table, using the following definitions of uniqueness:

Layer	Unique key	Notes
Middle Mile	frn, latitude, longitude	
CAI	anchorname, address	
Census Block	frn, fullfipsid, transtech	
Street Segment	frn, tlid, transtech	Tlid is an internal column.
Wireless	frn,transtech, spectrum, maxadup, maxaddown	

We also performed the following additional validations:

Layer	Validation Rules
Middle Mile	• Check (dbaname, provname, frn) against our FRN reference table • Valid census block id within the state of New Jersey • Check latitude not between 38.7 and 41.4 • Check longitude not between -75.6 and -73.8 • Shape should not be empty • All check_submission rules
CAI	• Valid zip code • Check latitude not between 38.7 and 41.4 • Check longitude not between -75.6 and -73.8 • SubScrbDown is less than SubSrbUP • CAIID is null for schools and libraries • Mismatch of transtech with SubScrbDown and SubSrbUp (either speed mismatch or symmetric transtech technology with SubScrDown not equal to SubScbUp) • Shape should not be empty • All check_submission rules

Census Block	• Check (dbaname, provname, frn) against our FRN reference table • Valid census block id within the state of New Jersey • The area of a census block should be less than < 2 square Mile • Shape should not be empty • All check_submission rule
Street Segment	• Check (dbaname, provname, frn) against our FRN reference table • Street segment is present in a census block >= 2 square miles • Shape should not be empty • All check_submission rule
Wireless	• Check (dbaname, provname, frn) against our FRN reference table • Shape should not be empty • All check_submission_rule

5.2 *Verification through Gap Analysis of Neighboring Census Blocks*

We have continued to assess coverages in the latest data using gap or what we call "gap" or "donut hole" analysis, first described in 2012 submissions. As part of our process to continually improve the quality of broad band Service Provider data that we provide to the NTIA, we have been analyzing data from our Oct. 2012 submission, described later in this section.

5.2.1 Gap Analysis

The analysis of the survey data identified some instances where a survey respondent identified their service provider and then the service provider's data did not show coverage in that respondent's Census Block. Further analysis indicated that a number of these instances occurred in 'gaps' or 'holes' in submitted provider coverage data. One way to define a simple hole is that it is a single CB that is not in the stated provider coverage area when all neighboring CBs are in the stated coverage area. Our investigations of these simple holes showed that some are associated with zero-population CBs – e.g., a CB that comprises a strip of land neighboring a major roadway. Other simple holes, however, appear to be anomalies in service provider data as we find examples of a residential CB, surrounded by other residential CBs, and no clear rationale to explain why the initial (middle) CB would not have coverage when all neighboring CBs do have coverage.

The next figure shows a few simple holes in Comcast data from Cranbury Township at a fine resolution.

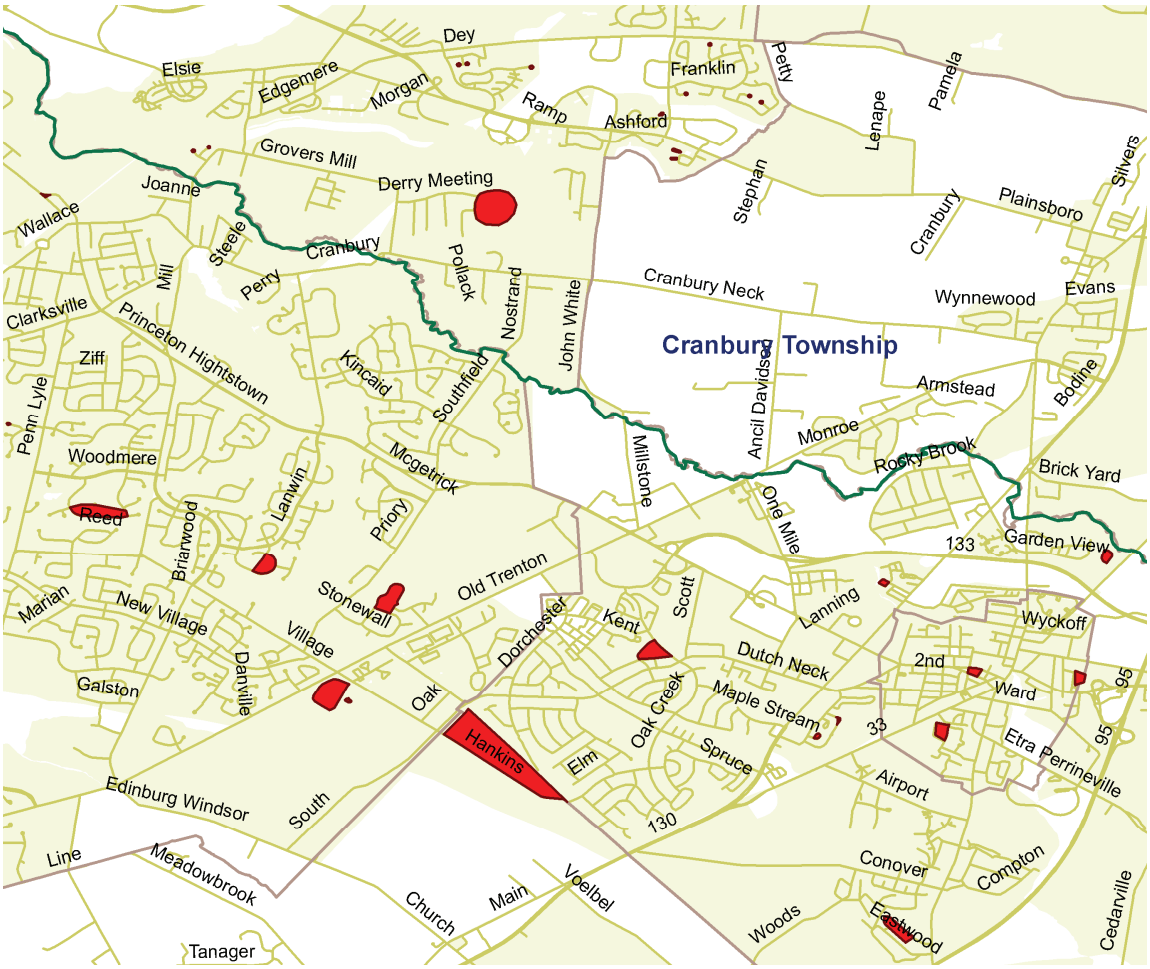


Figure 1: Detailed view of "Doughnut Holes" in coverage

Our analysis of the simple holes shows that some are anomalies that may provide a way to improve the accuracy of provider data. To pursue such possible improvements, we developed software that automates the identification of simple holes. Somewhat to our surprise, when we ran this software on the data for this submission, we found rather sizeable numbers of holes for some of the providers. For example, we identified almost 250 simple holes for Cablevision (including Lightpath) and over 1400 for Comcast. The following graphic illustrates the simple holes for Comcast.

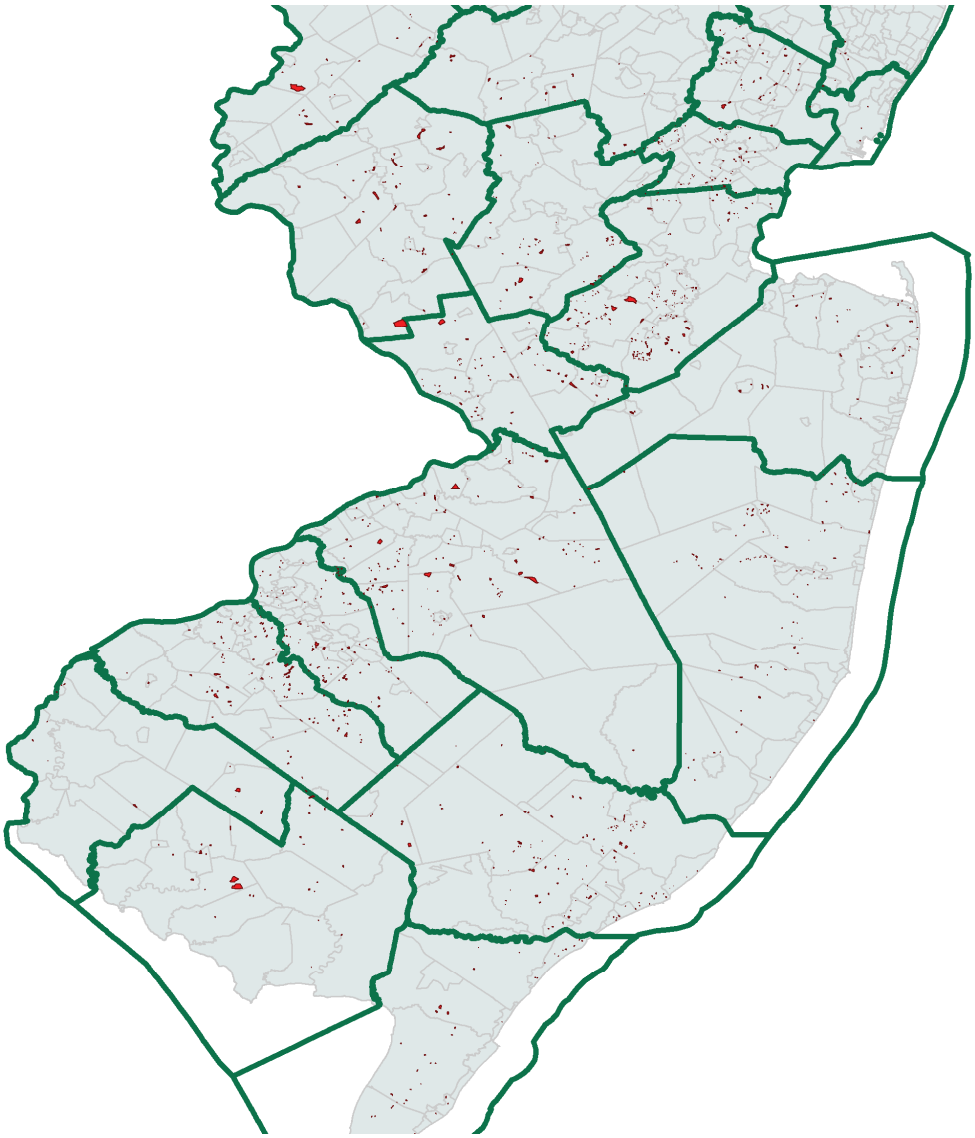


Figure 2: Graphic of Holes in Comcast Data:

For the providers where we identified such holes in the data they submitted for the Fall 2011 round, we generated a complete listing of the holes and a document containing a description of the process of identifying the holes and a detailed analysis of a few sample holes that appear in the provider's coverage. This information was sent to the providers along with the request for revised data for the Fall 2012 round. In the course developing the tools for this analysis, we noticed that Verizon has made changes in their process for generating submitted data, because while such holes had been present in the data they submitted previously, their Fall 2012 data had no such holes.

5.2.2 Gap Analysis for Spring 2013 Submission

In December 2012 we sent gap analysis feedback to 12 service providers with the hope that they might find it useful for improving the accuracy of their submitted service area data: Advanza Telecom,

Cablevision-Lightpath, CenturyLink, Comcast, Hometown Online, Level3, Megapath, Monmouth, Netcarrier Telecom, Service Electric of Sparta, Verizon Online, and Xo Communications Services. This feedback included for each "donut hole" census block both the census block ID and the number of its residents. We provided this feedback to demonstrate to providers that these supposedly "unserved" census blocks were also populated. An example of the feedback sent to these providers is shown below.

Ms. Mudge,

As part of our process to continually improve the quality of broad band Service Provider data that we provide to the NTIA, we have been analyzing data from our Oct. 2012 submission. One analysis we conduct discovers what we call "donut holes" -- these are unserved (but populated) census blocks, which are surrounded by census blocks for which you have reported service.

The results from our donut hole analysis of your recent data are attached to this note. These results include for each "donut hole" census block both the census block ID and the number of its residents. We are providing this feedback with the hope that it might be useful for improving the accuracy of your submitted service area. We wanted to do this well-enough in advance of the next submission round -- which will be due to us in the late January timeframe -- so as to give you an opportunity to revise your data for these census blocks, as you see fit.

Thank you again for you continued participation in the NJ Broadband Mapping Program.

Cliff Behrens
Manager - NJ BB Data Collection
Applied Communication Sciences
ConnectingNJ@groups.appcomsci.com
908.748.2380

provName	FRN	holeCBID	Population
megapath	3753753	340155007023041	57
megapath	3753753	340230085021066	58
megapath	3753753	340230085031001	56
megapath	3753753	340230088001012	28
megapath	3753753	340258121002029	28
megapath	3753753	340270461061037	95
megapath	3753753	340270461061038	4
megapath	3753753	340297202021009	20
megapath	3753753	340297202021038	21
megapath	3753753	340350522011005	29
megapath	3753753	340350522012061	104
megapath	3753753	340350534022002	37

In this particular example, the response of Megapath was:

Cliff,

We have looked these over and they are situations near coverage borders where we have smaller blocks surrounded by large, odd-shaped blocks that have partial coverage. When the partial coverage is

considered, these cases are not actually donuts. It's an artifact of the geometry and granularity of these blocks, and this is why the number of cases is relatively small (12 blocks compared to a coverage area of 94,419 blocks).

Thus, I can confirm that what we submitted is our best representation of our coverage area.

Thanks,

Stefanie

5.3 *Analysis of FCC Third Party Data Comparisons*

For the Fall 2012 submission the NJ BB Mapping Team benefited from having received feedback from NTIA/Michael Baker with results of comparisons they made between the data we had submitted in June-11 and Dec-11 and their third-party data. After a careful analysis of these results (provided in Appendix C) we determined that most of the discrepancies reported back to us could be attributed to data submitted by the following six providers: Comcast, DIECA/COVAD/Megapath, Sprint, T-Mobile, Verizon Online, and Verizon Wireless/Cellco. It is important to note that the NJ BB Mapping Team was not given copies of the third-party data, so the reasons for mismatches between the data we submitted and these third-party data were not clear. Our intent was two-fold: (1) to try and understand the scope of possible reasons underlying the discrepancies and (2) share with providers problematic fields, such as provider name or speed tier, which seemed to generate a lot of mismatches, and do some further inquiry to better validate the providers' data. Obviously, by working more closely with providers in this way, we hope to continue to improve data quality in future submissions. The table below summarizes the apparent source of discrepancies and the provider's explanation, for those who responded.

Provider	Probable Source of Discrepancy	Provider Explanation
Comcast	• Most mismatches on max advertised downstream speed (principally tier 10) and maximum advertised upstream speed (principally tier 7) for Cable Modem DOCSIS 3.0.	I believe this issue is one that we have encountered in other states, and results from the method by which we submit data. We provide maximum advertised speed data by MSA, but not all Census blocks within an MSA may offer D3 service--in which case, a D2 Census block may reflect a maximum advertised speed coded as "10." Similarly, but less frequently, Comcast may be in the process of upgrading service to D3 but has not yet initiated advertising for D3 speeds in that area--in which case, a D3 Census block may reflect a maximum advertised speed coded as "7." Accordingly, if a D2 Census block is in a MSA in which the overwhelming majority of Census blocks are coded as a "10," those D2 blocks should be coded as a "7." If a D3 Census block is in an MSA coded as a "7," that is likely due to the fact that Comcast has not begun advertising the D3 speeds in that MSA. I believe in our last submission, Comcast showed 100% D3 blocks throughout the state of New Jersey and a maximum advertised download speed of "10." I am waiting for this

		cycle's data to confirm that this remains the case. Comcast provides D3 throughout New Jersey, so there should be no disconnect between the Census block data and maximum advertised speeds.
DIECA/COVAD/Megapath	• Many provider name mismatches. Might this be attributed to recent M&A activities? • On records where provider name matches third-party data, large number of transfer technology mismatches, primarily involving transtech code 20 (SDSL) and code 30 (Other Copper Wireline). • Most mismatches on max advertised downstream speed involve tiers 5 & 7. • Most mismatches on max advertised upstream speed involve tiers 3, 5 & 7.	More than half of our lines in each state are supplied via ISP resellers, where we provide the underlying internet connectivity in a wholesale capacity for service that is otherwise branded, billed and supported as the ISP's own service. For over 90 of our resellers, we perform a layer 2 network handoff, such that the reseller's IP address space is what would be visible via the internet as well. This makes it impossible for a third party data collector to know these are being served by our last mile infrastructure without detailed cooperation from each ISP. Of course, if supplied a few example instances of these purported mismatches, we could readily provide an exact analysis. Our branding does not necessarily make it clear what underlying technologies are being used to provide service, so it is likely that a third party data collector has made incorrect assumptions in some situations. For example, we offer "TeleSpeed" and "Ethernet" branded services that may be utilizing symmetric DSL or other copper wireline technology. In a few cases, we also have legacy residential "TeleSurfer" services that may be utilizing symmetric or asymmetric DSL technology. Again, if we could be supplied a few examples, we could readily provide a exact analysis. In the case where a third party data provider may have found faster than reported speed, this may be due to the filing requirement that we report only services that can be installed within a typical service interval. From time to time, we also change our network deployment which could result in an increase or decrease in maximum available speed. Also, in our own direct business, we did not always sell our maximum provisionable speed, even though we made these offerings available to our resellers. We will be happy to provide more precise explanation if given actual examples.
Sprint	• Most mismatches on max advertised downstream speed tier 3. Possibility that tier 3 understates downstream speed? • Most mismatches on max advertised upstream speed	No explanation offered

	for tier 2. Possibly understating upstream speed?	
T-Mobile	• Most mismatches on max advertised downstream speed tiers 4 & 6. Possibly understated downstream speed in lowest tiers? • Most mismatches in max advertised upstream speed for tier 2. Possibly understating your upstream speed?	No explanation offered
Verizon Online	• Most mismatches on max advertised downstream speed involve tiers 4, 5 & 6 for ADSL. • Most mismatches on max advertised upstream speed involve tiers 2 (ADSL) & 7 (Optical Fiber). • Mismatches have to do with the way provider identifies ADSL speed tiers?	No explanation offered
Verizon Wireless/Cellco	• Most mismatches on max advertised downstream speed tiers 3 & 7. Possibility 3 understates downstream speed and 7 overstates it? • - Most mismatches in max advertised upstream speed is for tier 2. Possibly understating upstream speed?	No explanation offered

The complete set of email exchanges with these providers regarding these analyses is included in their respective data reports (see Appendix A). A set of six questions related to this analysis of discrepancies between NJ and third-party data was also transmitted to the NTIA/Michael Baker team and discussed in a teleconference call involving members of this team and the NJ Broadband Mapping Team. These questions, along with answers provided by the NTIA/Michael Baker participants, are provided in Appendix C.

5.4 *CAI – Service Provider Comparisons*

In preparation for the Spring 2013 submission, we also compared reported coverage areas submitted by service providers in Fall 2012 with names of those reported by community anchor institutions (CAIs), e.g., public libraries, who provide their broadband service. The results from our comparison identified census blocks containing CAIs that reported receiving service from a provider that was not covered by the provider's service area data. We gave feedback to 3 service providers (CableVision-Lightpath, Comcast and Verizon Online) with the hope that this feedback would be useful for improving the accuracy of the service area data they submitted in the Spring 2013 round. An example of the feedback given to providers is shown below.

Mr. Baecher,

As part of our process to continually improve the quality of broad band Service Provider data that we provide to the NTIA, we have been analyzing data from our Oct. 2012 submission. One analysis we conduct compares your reported coverage with names of broadband service providers reported by ***community anchor institutions*** (CAIs), e.g., public libraries.

The results from our comparison of CAI service provider reports to your recent data are attached to this note. These results list census blocks containing CAIs that reported receiving service from you that were not covered by your service area data. We are providing this feedback with the hope that it might be useful for improving the accuracy of your submitted service area. We wanted to do this well-enough in advance of the next submission round -- which will be due to us in the late January timeframe -- so as to give you an opportunity to revise your data for these census blocks, as you see fit.

Thank you again for you continued participation in the NJ Broadband Mapping Program.

Cliff Behrens
Manager - NJ BB Data Collection
Applied Communication Sciences
ConnectingNJ@groups.appcomsci.com
908.748.2380

Provider	CensusBlockID
CABLEVISION	340030451005010
CABLEVISION	340030571012002
CABLEVISION	340130206002001
CABLEVISION	340170067003000
CABLEVISION	340258062023017
CABLEVISION	340297132022000
CABLEVISION	340297132031007
CABLEVISION	340297132031010
CABLEVISION	340297134022010
CABLEVISION	340297134022018
CABLEVISION	340297136001006
CABLEVISION	340297139003018
CABLEVISION	340297142004004
CABLEVISION	340390394002007

5.5 *Data Confidence Scale*

In the Fall of 2012 our team began work on the development of a data confidence scale for quantifying the quality of data submitted by service providers. We reviewed data confidence scales as implemented by other states and territories, along with current NTIA guidance. We prepared a white paper that outlined a comprehensive approach for developing a data confidence scale, and developed an initial scale for test implementation in 1Q2013 (see Appendix D). Results from both donut-hole analyses and CAI-Service Provider comparisons mentioned above were tried before including them as factors in data confidence scale estimation. Based on the factors used to compute confidence values for service provider

data, we expanded our internal data schema to include fields needed to compute *source*, *currency* and *verification* metrics that comprise our confidence scale (see Appendix E).

5.6 *NJ Broadband Speed Testing*

The FCC and a number of NTIA grantees are already collecting speed test data with MLabs Network Diagnostic Tool (NDT) and OOKLA Speedtest technology. However, some NTIA grantees have recognized that, for speed test data to be useful for data validation purposes, they must be correlated with ancillary information, particularly test-taker location and service provider. We have developed a plan that applies crowd-sourcing to acquire speed test and associated ancillary information useful for validating access data collected directly from NJ broadband service providers. The plan is based on lessons learned and reported by other NTIA grantees, and reuses to the degree possible existing technology. The proposed approach features two essential components: (1) a website that acquires speed data and associated ancillary address and broadband service data, and (2) media used by social networks of interest with incentives that draw members of these networks to the aforementioned website. With standardized speed tests, that are both geolocated and labeled by service type and provider, it should be possible to validate and, thus, improve the quality of data used to map broadband access in New Jersey. We have prepared a white paper outlining our approach and web server design for collecting standardized speed test data through the NJ-OIT BB mapping website using the MLabs Network Diagnostic Tool (NDT) (see Appendix F). Moreover, NJ-OIT has developed a survey instrument for collecting online broadband connectivity data from CAIs. Using address location and timestamp as keys, it should be possible to correlate speed test data for a CAI with other survey data. We intend to deploy this speed test service during the second quarter 2013 and hope to have some of the test results to use for data validation of future submissions.

6 Handling of Special Cases

6.1 *Fixed Wireless Processing*

NTIA had questioned us about the coverage areas associated with two providers who offer fixed-wireless service in New Jersey. In one case, the provider, Global Online Electronic Services, uses fixed wireless links as a substitute for wireline connections and serves a single location with each link. We therefore generated a "coverage area" by using the census block that contains the address. This is clearly not the result of propagation model analysis, but due to the nature of the service they provide accurately reflects their capabilities.

We also receive information from a new fixed wireless provider, Jersey Shore Wireless. They provided us with image files (e.g., jpegs) with coverage maps that had been hand-drawn based on a drive-test they had conducted in 2008. Given the source of the information, the shapes tend to align with major roadways. Jersey Shore Wireless did not have the resources available for propagation modeling and we did not have sufficient time to assist them in performing this task. For this round, we manually converted their images into shape files. It was clear that these shapes would understate, rather than overstate coverage, and thus it seemed reasonable to include them.

6.2 *Process Verification*

We have instituted a thorough review of our process steps. The review involved investigation of each process step by an individual other than the person who had created the process or executed it in the past. As a result of this process, we have implemented several process improvements. The corrections and improvements include:

- For CenturyLink, altered Census Block process to allow provider's speed values, with validation-related adjustments, rather than setting all values the same.

- For Hometown Online, adjusted Census Block process to account for the fact that provider reported different transtech and speed values in one census tract.
- For Service Electric – Sparta, set middle mile capacity and type values, which had inadvertently been left null in the previous submission. Adjusted technology and speed values to reflect DOCSIS 3.0.
- For ViaSat, corrected spectrum value to reflect that they offer satellite service.
- For Verizon, corrected the ownership value of the middle mile locations, which had been inadvertently left as null in previous rounds.
- For Xchange Telecom, set provider type to "reseller", based on interaction with provider that indicated that they lease facilities from Verizon.
- Revised CAI processing rules to insert "NA" for building number when no value was available.
- Made multiple improvements to CAI address processing to enhance the automated address extraction and mapping to reference data.

6.3 *Validation Warnings*

We received warning messages from the NTIA data validation tool when processing submission data from several providers. The details of these warnings and our reaction to them are included in the individual provider reports later in this document. Here we provide a convenient summary of those warnings that are still present in the submitted data.

6.3.1 Provider Warnings

The following table describes the warnings we received from the validation script and provides our explanations for submitting these values.

Provider	Warning
AT&T Mobility LLC	*Issue:* We received a warning on the wireless shape record for the combination of downstream speed code of 7 (10-25 Mbps) with a transtech code of 80 (Mobile Wireless) for the LTE service. *Resolution:* The maximum advertised speed tier provided in the cover letter that came with the provider's submission is 7. The provider confirmed that the value is correct.
CenturyLink	*Issue:* We received warnings on 7,134 census blocks and 1,779 street segments for the combination of a downstream speed code of 7 (10-25 Mbps) with a transtech code of 10 (ADSL). *Resolution:* The provider had originally reported speeds exceeding 25 Mbps, or a speed code of 8. When we questioned these, the provider could not confirm those values, but asserted that all areas were covered with speeds exceeding 10 Mbps.
Comcast	*Issue:* We received warnings on 74,719 census blocks and 3,142 street segments for the combination of an upstream speed code of 9 (50-100 Mbps) with a transtech code of 40 (DOCSIS 3.1). *Resolution:* The provider confirmed that the speed was verified with their engineers. A search of their Web site, http://www.comcast.com/ned-305, shows the downstream speed of 305 Mbps. The provider said that we have to contact customer service reps to get the upstream speed. We called them and were told that the upstream speed is 65 Mbps in our area.
Global Online Electronic Services, Inc.	*Issue:* We received warnings on the wireless shape record for the combination of upstream and downstream speed codes of 7 (10-25 Mbps) with a transtech code of 70 (Fixed Wireless - Unlicensed).

	Resolution: The provider has only a single fixed wireless site, and it is used for point-to-point links, rather than to provide a coverage area. The provider confirmed that the speed is 10 Mbps.
Hometown Online	*Issue:* We received warnings on 405 census blocks for the combination of a downstream speed code of 7 (10-25 Mbps) with a transtech code of 10 (ADSL). *Resolution:* We searched the provider's Web site for speed information. We only found one reference to speed packages, and these values and the Web page seemed out of date. We sent a request for clarification to the provider. The provider acknowledged the validation requirements, indicated that the Web page found by our search was in error and confirmed the submitted speed values. The president of the company also indicated that they would be launching a new Web site with corrected speed information in the near future.
Megapath	*Issue:* We received warnings on 9,681 census blocks for the combination of a downstream speed code of 7 (10-25 Mbps) with a transtech code of 10 (ADSL). *Resolution:* The provider confirmed that they support 15 Mbps with their ADSL2+ service in limited regions of the state.
Service Electric Broadband Cable (Sparta)	*Issue:* We received warnings on 5,265 census blocks and 985 street segments for the combination of a downstream speed code of 8 (25-50 Mbps) with a transtech code of 40 (DOCSIS 3.1). *Resolution:* The provider was not willing to commit that they offered anything faster. A search of their Web site confirmed that the fastest speed they advertise is 35 Mbps down and 3 Mbps up.
T-Mobile	*Issue:* We received a warning on the wireless shape record for the combination of downstream speed code of 7 (10-25 Mbps) with a transtech code of 80 (Mobile Wireless). *Resolution:* Investigation of the T-Mobile Web site showed that they are advertising average speeds "approaching 10 Mbps" and peak speeds of 27 Mbps. We sent a note to the provider to verify the value, and the provider confirmed that these values are correct.
Verizon Wireless	*Issue:* We received a warning on the wireless shape record for the combination of downstream speed code of 7 (10-25 Mbps) with a transtech code of 80 (Mobile Wireless). *Resolution:* The maximum advertised speeds provided in the cover letter that came with the provider's submission are 600 - 9.99 mbps down and 3.00 - 5.99 mbps up. The typical speeds are provided as ranges: 5 - 12 Mbps down and 2 - 5 Mbps up. For max adv speeds we had originally encoded the submitted down speed as value 6 (range 6-10Mbps) and encoded the submitted up speed as value 5 (range 3-6mbps). Based on the email from Anne Neville data 2/21/2012, we modified the down speed to code 7.
Xchange Telecom	*Issue:* We received warnings on 1,012 census blocks for the combination of a downstream speed code of 7 (10-25 Mbps) with a transtech code of 10 (ADSL). *Resolution:* The provider confirmed, and we validated via their Web site, that they advertise 10 Mbps, which is just at the bottom of the range for code 7.

6.3.2 CAI Warnings

The validation script produced 10718 warnings on our CAI data for 10695 null values of transtech and 23 zero values of transtech. This is a result of our decision to include all the CAIs that we could reliably identify and geo-locate, even if we have not been able to ascertain the broadband usage at the site as yet. The 23 records with zero for transtech are a result of two forms of data submission. 16 of these records were a result of submissions to our website where

the CAIs selected it to signify a technology other than the NTIA defined ones. These are accompanied by valid speed tiers. The remaining 7 were from records where the technology, downstream speed and upstream speed were all zero. We are in the process of ascertaining if this indicates that there is no broadband connection or if it is unknown.

This full list provides us with a target for our outreach efforts to these institutions. The set of "complete records", which include full broadband access information, is a key metric we are using to track progress in obtaining information about the broadband access. The counts of these records by category are included in the table above and in the CAI data processing section in Appendix B.

Appendix A: New Jersey Provider Data Reports

Connecting New Jersey - Broadband Provider Data Report

Provider: Advanza
Received: August 2011
Submission date: April 2013

This report presents details on processing of broadband data for delivery to the National Telecommunications and Information Administration.

For April 2013:
This is a stub report, since data from the previous submission was reused unchanged. The complete report from the previous submission begins on the next page. Notable differences from the processing done on the previous submission are listed next.

Processing Steps:

1. Used ESRI: Data Management Tools->General->Append with NO_TEST schema type to copy advanza_oct2012.BB_Service_CensusBlock to advanza _apr2013. BB_Service_CensusBlock.

For October 2012:
This is a stub report, since data from the previous submission was reused unchanged. The complete report from the previous submission begins on the next page. Notable differences from the processing done on the previous submission are listed next.

Section 1: NDA Status

Advanza states that NONE is required.

Section 2: Submission Overview

<table>
<tr><th colspan="4">AVAILABILITY DATA – RECEIVED AUGUST, 2010</th></tr>
<tr><td rowspan="5">ID</td><td colspan="2">Provider name</td><td>Advanza Telecom Inc</td></tr>
<tr><td colspan="2">“Doing business as” name</td><td>Advanza</td></tr>
<tr><td colspan="2">FRN</td><td>0017029141</td></tr>
<tr><td colspan="2">Holding Company Name</td><td>Advanza Telecom, Inc.</td></tr>
<tr><td colspan="2">Holding Company Number</td><td>180002</td></tr>
<tr><td colspan="4">FOR WIRELINE</td></tr>
<tr><td>Filetypes</td><td colspan="3">1 xlsx spreadsheet</td></tr>
<tr><td>File size</td><td colspan="3">NJBB_0017029141_AddressLevelAvailability-20110630.xls file has 47 records</td></tr>
<tr><td>Speeds</td><td>Type</td><td>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)</td><td>All provided speeds have code 4 (1.5 mbps ≤ BW < 3.0 mbps) for all records, which would make sense if all service is T1</td></tr>
</table>

	Typical-upstream	X	Address	
	Typical-downstream	X	Address	
	Advertised-upstream	X	Address	
	Advertised-downstream	X	Address	
	Subscriber-weighted-up	☐	Not provided	
	Subscriber-weighted-down	☐	Not provided	
Technology Type	Code 30 (= Other Copper Wireline) given for all records			
End-user specification	Values 2, 3 or 4 (Government, Small Business or Enterprises).			
Comments: Data was submitted for Fall 2011 submission. Provider did not respond to requests for revised data. Confirmed via Web site that they offer these services (T1 and NxT1). Web site lists possibility of higher speeds as well. Based on this information, it was determined that the data is likely still accurate and decision was made to re-use prior data.				
INTERCONNECTION DATA – NO DATA PROVIDED				
ID				
File size				
Ownership				
Transport Type				
Data Rates/Capacity				
Location				
Comments:				

Section 3: Submission File Details

Received one file by secure upload to the connectingnj web site.

Size	Name
71,168	NJBB_0017029141_AddressLevelAvailability-20110630.xls

The addresses in this file appear to be for individual customers (as opposed to addresses of multi-tenant buildings in a central business district).

Section 4: Data Validation,Transformation and Loading

The standard NDA prohibits us from submitting address-level data to the NTIA. Instead, we discover the census block for each customer address, and then report the census block shape drawn from Census Bureau TigerLine reference data.

NTIA Table BB_Service_CensusBlock

Loaded from the file mentioned above. The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	Set to " Advanza Telecom Inc" (no trailing period)
DBANAME	Not supplied; set same as PROVNAME
PROVIDER_TYPE	Set to 1
FRN	Set to "0017029141"
STATEFIPS	Set to “34” (NJ)
COUNTYFIPS	Populated from Census Block FIPS Code (first 3 digits)
TRACT	Populated from Census Block FIPS Code (next 6 digits)
BLOCKID	Populated from Census Block FIPS Code
FULLFIPSID	Populated from Census Block FIPS Code
TRANSTECH	As supplied in column Tehcnology of Transmission (sic)
MAXADDOWN	As supplied in column Maximum Advertised Downstream Speed
MAXADUP	As supplied in column Maximum Advertised Upstream Speed
TYPICDOWN	Set to null (see below)
TYPICUP	Set to null (see below)
ENDUSERCAT	Set to null (see below)
SHAPE	Copied from Census Bureau TigerLine 2010, as matched by spatial join on geocoded address

Internal processing notes.

1. Following steps were performed for Fall 2011 submission
    a. Geocoded the addresses using an Arroyo flow and the Yahoo geocoder, leaving the result with address and lat, long data in an Excel spreadsheet. All addresses were successfully geo-coded.
    b. Imported the spreadsheet to a simple ESRI geodatabase table
    c. Added point shapes corresponding to each Latitude,Longitude pair by creating a feature class from the table using ArcCatalog’s “Create Feature Class from XY Table” option
    d. Added a column containing the ID of the containing year 2010 census block using ArcCatalog's spatial join feature. The newly created point shapes are joined against census block shapes from reference data. All records successfully spatially joined on 2010 NJ Census Block shapes.
    e. Discarded typical speeds since they were in all cases identical to maximum advertised speeds, not measured values.
    f. The end user category value as originally supplied applied to an address, but we must anonymize the addresses and report census blocks. The NTIA directs us to report the “predominant” end-user category, which is

not supplied here.

g. Copied contents to the target data model table with the transformations specified above. Discarded 15 rows with duplicate census blocks.

2. Copied prior data into new BB_Service_CensusBlock table.
3. All data passed NTIA validations.

Section 5: Clarification Questions and Responses

Subject: Re: URGENT: Response Requested: Get your Broadband Services on the Spring 2013 National Broadband Map
Date: Thu, 07 Feb 2013 13:23:26 -0500
From: Tom Garrison <tomg@advanzasystems.com>
To: Connecting NJ <ConnectingNJ@appcomsci.com>

Hi Cliff,

It's been a mixture. Of the 53 T1's we're moving, so far 7 went to XO and stayed on T1's, 8 to Comcast, 3 to Optimum, 4 to Fios, and 17 left us and didn't say what they did. Of the remaining ones I expect 4 more to move to XO T1's, 5 will be cancelling, and the rest haven't told us what they want to do (probably leave or go to cable).

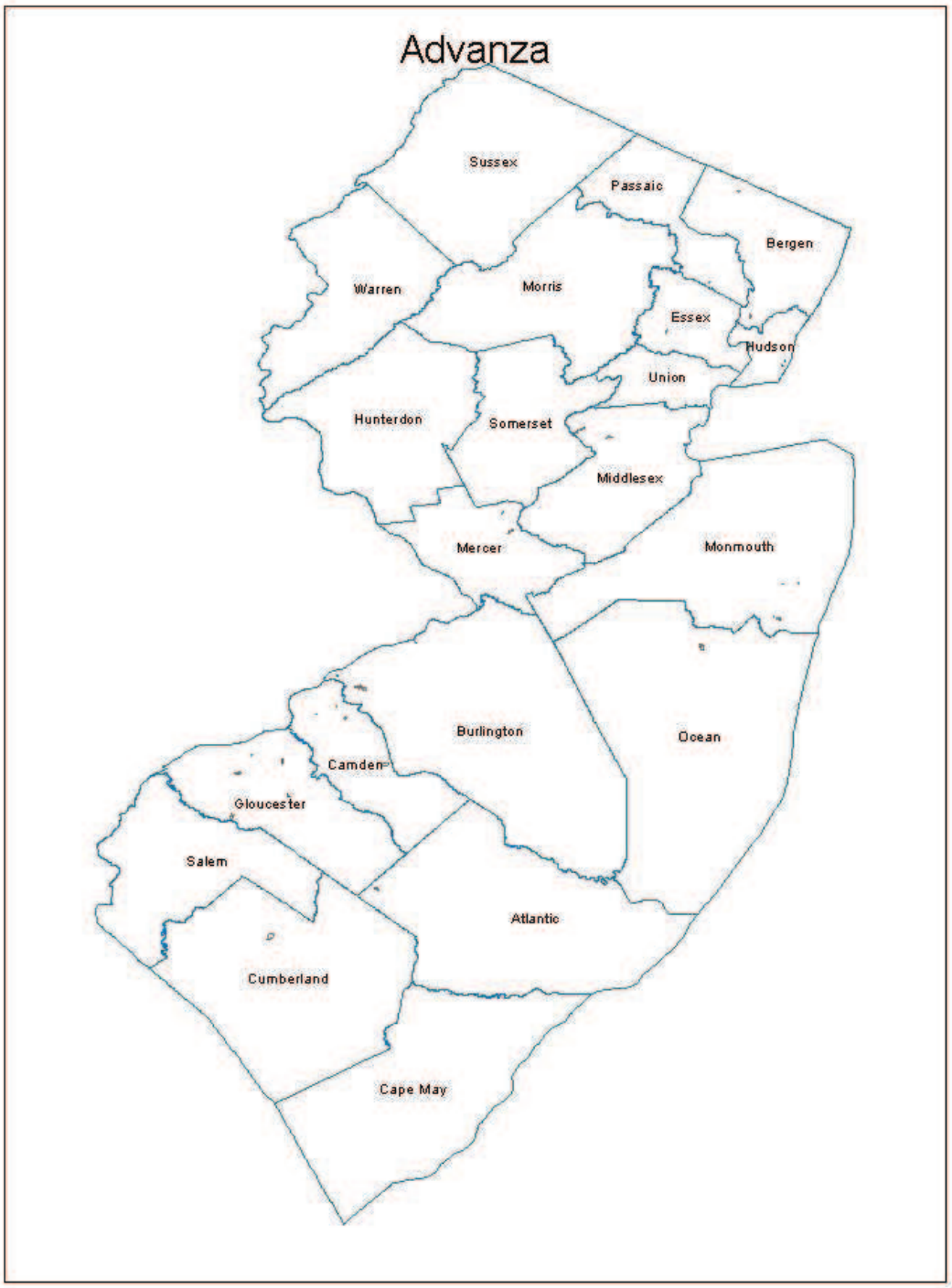
Tom

>On 2/7/2013 11:42 AM, Tom Garrison wrote:
>>Hi Cliff,
>>
>>Actually, yes, it has. We now have less than 50 circuits and we're in
>>the process of moving them off of our network. In another month we
>>will have zero. Unfortunately we've been absolutely swamped getting
>>these customers moved and I haven't had time to do a submission.
>>Since they're all going away do you even want/need my data?
>>
>>Tom
>>
>>
>>At 11:09 AM 2/7/2013, Connecting NJ wrote:
>>>Tom,
>>>
>>>I know that in the past you mentioned you only have around 100
>>>circuits and little time to collect data. I was wondering whether
>>>your situation has changed since we last communicated? If so, we
>>>would appreciated having your data in our submission to the NTIA.
>>>
>>>Best wishes,
>>>
>>>Cliff

>>>

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



Connecting New Jersey - Broadband Provider Data Report

Provider: Appia Communications, Inc.
Received: August 2010
Submission date: October 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

For April 2013:

We changed the provname and dbaname changed from "Netlogic, Inc." and "Voxitas" to "Appia Communications, Inc.". We also changed the FRN from "0006825954" to "0018898650".

This is a stub report, since data from the previous submission was reused unchanged. The complete report from the previous submission begins on the next page. Notable differences from the processing done on the previous submission are listed next.

Processing Steps:

2. Used ESRI: Data Management Tools->General->Append with NO_TEST schema type to copy voxitas_oct2012.BB_Service_CensusBlock to voxitas _apr2013. BB_Service_CensusBlock.

For October 2012:
This is a stub report, since data from the previous submission was reused unchanged. The complete report from the previous submission begins on the next page. Notable differences from the processing done on the previous submission are listed next.

Section 1: NDA Status

Executed.

Section 2: Submission Overview

AVAILABILITY DATA		
ID	Provider name “Doing business as” name FRN	Netlogic, Inc. Voxitas 0006825954
FOR WIRELINE		
Filetypes	Excel spreadsheet	
File size	9767 bytes, 4 data rows	

<table>
<tr><td rowspan="8">Speeds</td><td>Type</td><td></td><td>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)</td><td rowspan="8">Address rows with speed entries were provided, probably the speed promised to the customer. Not averaged over an area so not typical; no advertised speeds provided.</td></tr>
<tr><td>Typical-upstream</td><td></td><td>Not provided</td></tr>
<tr><td>Typical-downstream</td><td></td><td>Not provided</td></tr>
<tr><td>Advertised-upstream</td><td></td><td>Not provided</td></tr>
<tr><td>Advertised-downstream</td><td></td><td>Not provided</td></tr>
<tr><td>Subscriber-weighted-up</td><td></td><td>Not provided</td></tr>
<tr><td>Subscriber-weighted-down</td><td></td><td>Not provided</td></tr>
<tr><td>Technology Type</td><td colspan="4">Not provided; Web site search indicates and provider confirmed “Copper – Other”</td></tr>
<tr><td>End-user specification</td><td colspan="4">Not provided</td></tr>
<tr><td colspan="5">Comments:</td></tr>
<tr><td colspan="5">INTERCONNECTION DATA</td></tr>
<tr><td>ID</td><td colspan="4"></td></tr>
<tr><td>File size</td><td colspan="4"></td></tr>
<tr><td>Ownership</td><td colspan="4"></td></tr>
<tr><td>Transport Type</td><td colspan="4"></td></tr>
<tr><td>Data Rates/Capacity</td><td colspan="4"></td></tr>
<tr><td>Location</td><td colspan="4"></td></tr>
<tr><td colspan="5">Comments: Not provided</td></tr>
</table>

Section 3: Submission File Details

Received 1 file by secure upload.

Size	Name
9767	NJBroadband.xlsx

The file has 4 (four) rows of data. All have customer names and addresses. Three records describe DS1 service, one describes something else. Speeds listed are probably the provisioned speeds, not typical or advertised. No cover letter with DBA

name, FRN, or other company data is present. No coded representations of data such as end user type, technology of transmission, etc. are provided.

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_Service_CensusBlock

Loaded from supplied file "NJBroadband.xlsx" (4 rows). The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	Set to "Netlogic, Inc."
DBANAME	Set to "Voxitas"
RESELLER	Set to "N"
FRN	Set to "0006825954"
STATEFIPS	Set to "34" (NJ)
COUNTYFIPS	Populated from Census Block FIPS Code (first 3 digits)
TRACT	Populated from Census Block FIPS Code (next 6 digits)
BLOCKID	Populated from Census Block FIPS Code
BLOCKSUBGROUP	Set to null
FULLFIPSID	Populated from Census Block FIPS Code
TRANSTECH	Set to "30"
MAXADDOWN	As supplied in column Downstream
MAXADUP	As supplied in column Upstream
TYPICDOWN	Set to null, not provided
TYPICUP	Set to null, not provided
SHAPE	Copied from Census Bureau TigerLine 2000, as matched by spatial join on geocoded address

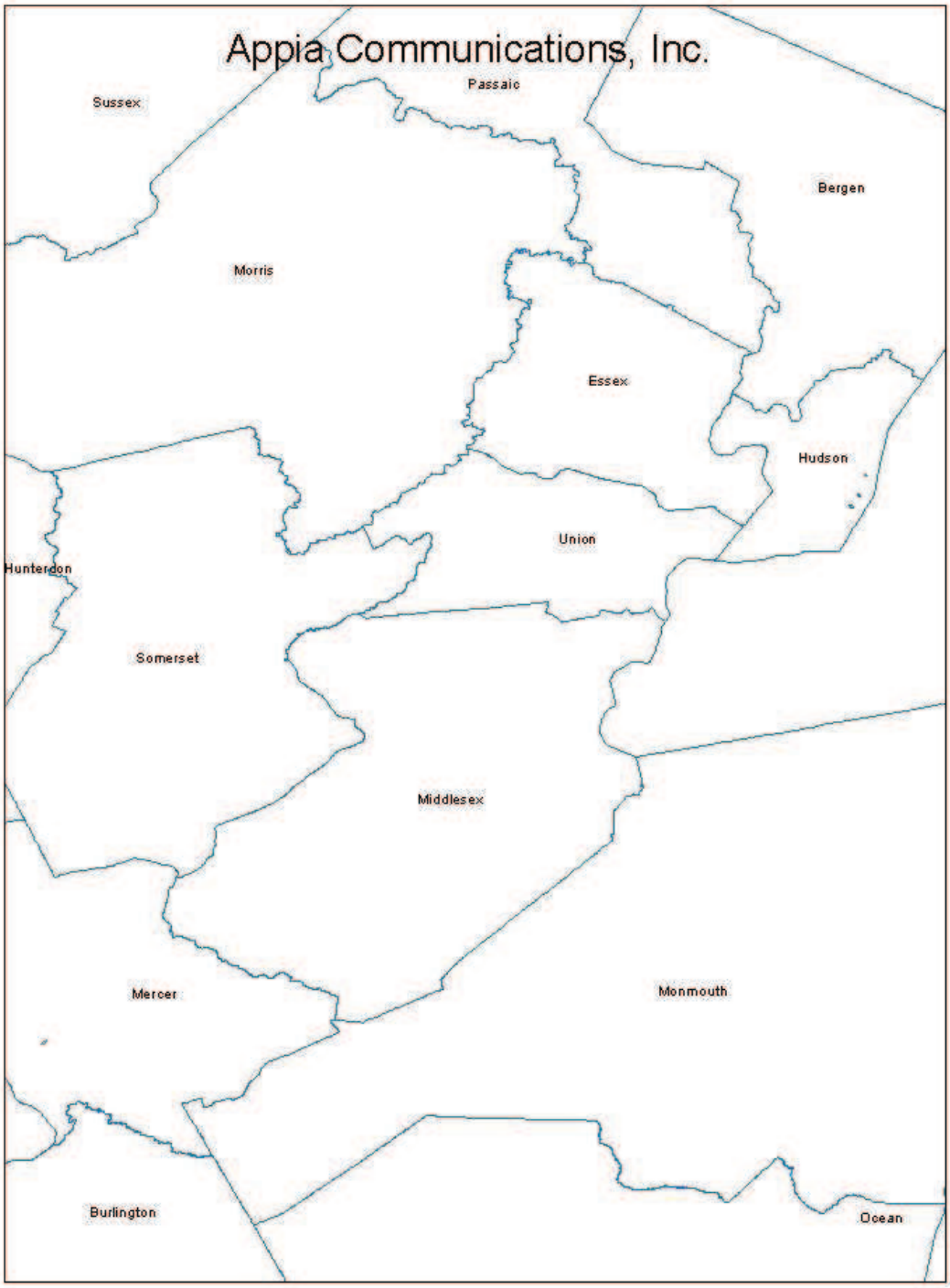
Internal processing notes:

1. Following steps were performed when data was initially submitted and results were reused in this round
    a. Geocoded the addresses using the Google geocoder.
    b. Created an excel sheet and imported to a geodatabase table.
    c. Added point shapes corresponding to each Latitude,Longitude pair by creating a feature class from the table using ArcCatalog's "Create Feature Class from XY Table" option.
    d. Added a column containing the ID of the containing year 2000 census block via a spatial join of the point shapes and the census block shapes from reference data.
    e. Discarded NN rows with duplicate census blocks.
2. Ran NTIA validations and all passed

Section 5: Clarification Questions and Responses

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



Connecting New Jersey - Broadband Provider Data Report

Provider: AT&T Mobility LLC
Received: February 2013
Submission date: April 2013

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

NDA was executed with NJ OIT.

Section 2: Submission Overview

<table>
<tr><th colspan="4">AVAILABILITY DATA</th></tr>
<tr><td>ID</td><td colspan="2">Provider name
“Doing business as” name
FRN</td><td>AT&T Mobility LLC
AT&T Mobility LLC
0004979233 for mobility
NB: “AT&T Corporation, Inc.” with FRN 0004979244 for middle mile</td></tr>
<tr><th colspan="4">FOR WIRELESS</th></tr>
<tr><td>Filetypes</td><td colspan="2">shapefile collection: shp/dbf/prj/shx, mdb, gdb, imagefile etc.</td><td>Spreadsheet (XLSX) and shapefile that uses projection GCS_WGS_1984</td></tr>
<tr><td>Speeds</td><td colspan="3"><table>
<tr><th>Type</th><th>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode)</th></tr>
<tr><td>Upstream max adv</td><td>State</td></tr>
<tr><td>Downstream max adv</td><td>State</td></tr>
<tr><td>Upstream typical</td><td>Not provided</td></tr>
<tr><td>Downstream typical</td><td>Not provided</td></tr>
<tr><td>Subscriber-weighted</td><td>Not provided</td></tr>
</table></td></tr>
<tr><td>Technology Type</td><td colspan="2">Spectrum (Mhz, FCC code)</td><td>Cellular (code 1) and PCS (code 3)</td></tr>
<tr><td colspan="4">Comments:</td></tr>
<tr><th colspan="4">INTERCONNECTION DATA</th></tr>
</table>

ID	
File size	Single row
Ownership	Code 0
Transport Type	Code 1
Data Rates/Capacity	Code 6
Location	Newark, NJ
Comments: Single location provided	

Data overview:

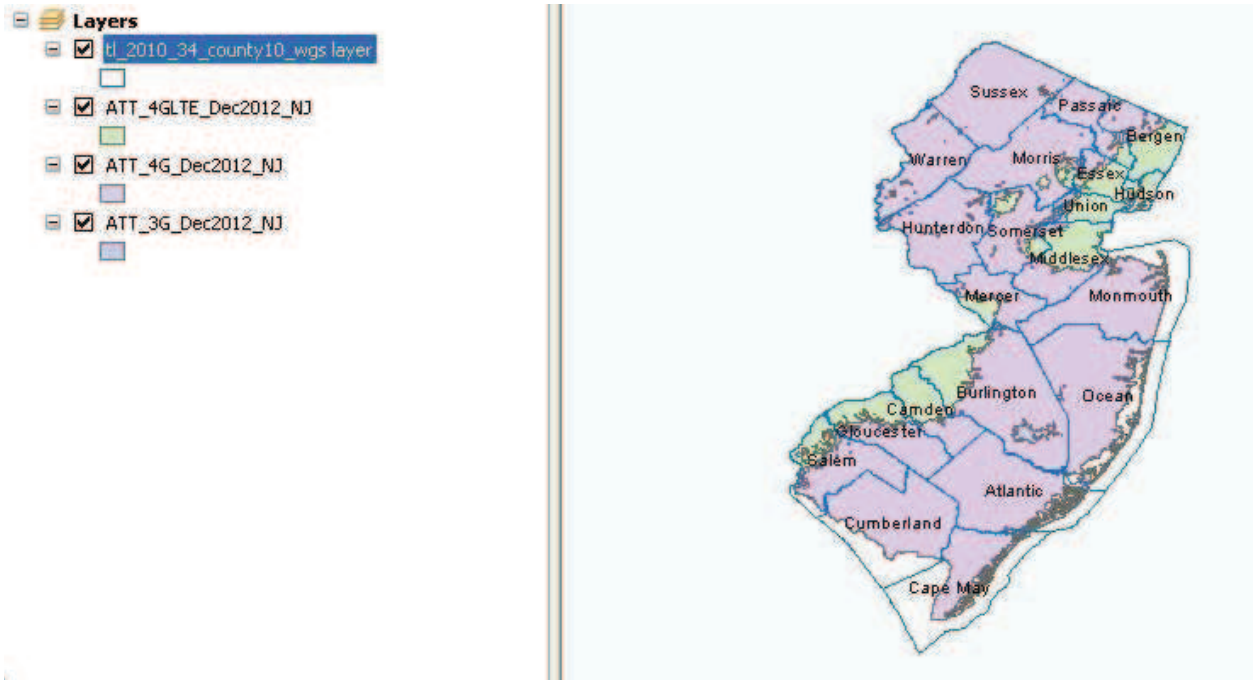


Figure 1. Quick load of data into ArcMap

Section 3: Submission File Details

Received files by SECURE UPLOAD:

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_ConnectionPoint_MiddleMile

Loaded from supplied Excel Spreadsheet "ATT Router Locations December 2012.xlsx" (1 row). Since data is identical to that included in previous submission, we copied the previous data.

The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	As supplied
DBANAME	As supplied
FRN	Added leading zeroes to read 0004496774 (see below)
OWNERSHIP	As provided in column "Ownership"
BHCAPACITY	As provided in column "Serving Facility Capacity"
BHTYPE	As provided in column "Serving Facility Type"
LATITUDE	As provided in column "Latitude_geo"
LONGITUDE	As provided in column "Longitude_geo"
ELEVFEET	Set to "0" (zero)
STATEABBR	Set to "NJ"
FULLFIPSID	ID of containing census block from Year 2010 Census Bureau TigerLine reference data
SHAPE	Created using ESRI ArcDesktop

Internal notes on processing:

3. Used the provider name, DBA name, and FRN as supplied, after adding back

leading zeros to the FRN. Note that the middle-mile entity is different than the mobility entity and per clarification from AT&T during the October 2010 submission round, should indeed be reported differently.
4. Imported the excel sheet to a geo-database table.
5. Added point for the Latitude, Longitude pair by creating a feature class from the table using ArcCatalog's "Create Feature Class from XY Table" option.
6. Mapped to separate shape file to correct tolerance.
7. Added a column containing the ID of the containing year 2010 census block via a spatial join of the points and the census block shapes from reference data.

NTIA Table BB_Service_Wireless

April 2013:
There are 3 shape files submitted: ATT_3G_Dec2012_NJ, ATT_4G_Dec2012, and ATT_4GLTE_Dec2012. Different from the last submission, each shape file has only one record.

October 2012:
Different from the last submission where only one shape file, UMTS, is submitted, there are 3 shape files submitted this time: ATT_LTE_July2012_NJ with 47 records, NJ_ATT_3G_July2012 with 25 records, and NJ_ATT_4G_July2012 with 9 records.

The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	Set to "AT&T Mobility LLC"
DBANAME	As supplied in file Mobility Response NJ June 2011.xlsx
FRN	Set to 0004979233
TRANSTECH	As supplied in file Mobility Response NJ June 2010.xlsx
SPECTRUM	Set to "3" per translation shown below
MAXADDOWN	Set to "4", see below.
MAXADUP	Set to "3", see below.
TYPICDOWN	Not provided, set to null
TYPICUP	Not provided, set to null
STATEABBR	Set to "NJ"
SHAPE	As supplied.

Internal notes on processing:
1. File "Mobility Response Template December 2012 New Jersey.xlsx" (same as the one in the previous submission) contains three rows with provider name, DBA name, FRN, technology of transmission, a specification of the spectrum bands used, and the maximum advertised up/down speeds. The FRN is missing the leading zeros. The TechTrans code is valid. The max speed values are plausible.

2. The shape files have no text attributes associated with the row. The coverage area is most of the State of New Jersey, broken into separate shapes by various horizontal and vertical lines. The map strongly resembles the map shown at www.wireless.att.com.
3. The supplied shapes use geographic coordinate system name GCS_WGS_1984. The NTIA data model requires the same coordinate system. No geographic transformation was required, but the XY Tolerance value differs from the required value. Imported shape then mapped to separate shape with proper tolerance which resulted in a new feature class with the suffix "_tol".
4. NTIA requires shapes to be contained in the NJ state boundary. Although we visually verified that it is the case, we clipped the shape using ESRI: Analysis Tools-> Extract -> Clip with, select feature class refdata_2010.tl_2010_34_state10_wgs. The feature classes have the suffix "_clip"
5. This step is not needed in the April 2013 submission as each shape has only one record: Coalesced the single-part polygons into one multi-part polygon using the ArcGIS "Dissolve" tool, which resulted in a new feature class with the suffix "_Dissolve".
6. Spectrum: AT&T Mobility provided multiple columns of data about their spectrum use. Searching on the web suggests that AT&T 3G uses frequencies 850MHz and 1900Mhz. The NTIA data model has a single column for spectrum. No mapping is provided for frequency 850MHz. Frequency 1900MHz corresponds to NTIA "SPECTRUM USED" code value 3 – this was used for the 3G and 4G services.
7. Speeds were given as index values conforming to the NTIA model.
8. The only data imputed was the state abbreviation.
9. Validation rules produced a warning on the wireless shape record for the combination of downstream speed code of 7 (10-25 Mbps) with a transtech code of 80 (Mobile Wireless) for the LTE service. The maximum advertised speed tier provided in the cover letter that came with the provider's submission is 7. Provider confirmed that the value is correct.

Section 5: Clarification Questions and Responses

From: Connecting NJ [mailto:ConnectingNJ@appcomsci.com]
Sent: Friday, August 31, 2012 3:17 PM
To: WAGNER, GREGORY G
Subject: Re: NJ Broadband Data Collection - Fall 2012

Greg,

Before we submit provider data to the NTIA it must be validated by an NTIA script. When we processed your submission with this script, it generated a warning and recommended that for transtech=80 the maxaddown speed should be changed from "7" to "6." In other words, the NTIA believes that the maximum

advertised downstream Service Speed for Terrestrial Mobil Wireless cannot equal 10 mbps or greater (hence the
recommended value "6", see table below). I just need to confirm from
you that you think "7" is the value you intended to submit and the speed you support.

Best regards,

Cliff
Subject: RE: NJ Broadband Data Collection - Fall 2012
Date: Tue, 4 Sep 2012 13:15:02 +0000
From: WAGNER, GREGORY G <gw5604@att.com>
To: Connecting NJ <ConnectingNJ@appcomsci.com>

Cliff,

We have determined that speed tier 7 is the appropriate designation for our LTE product.

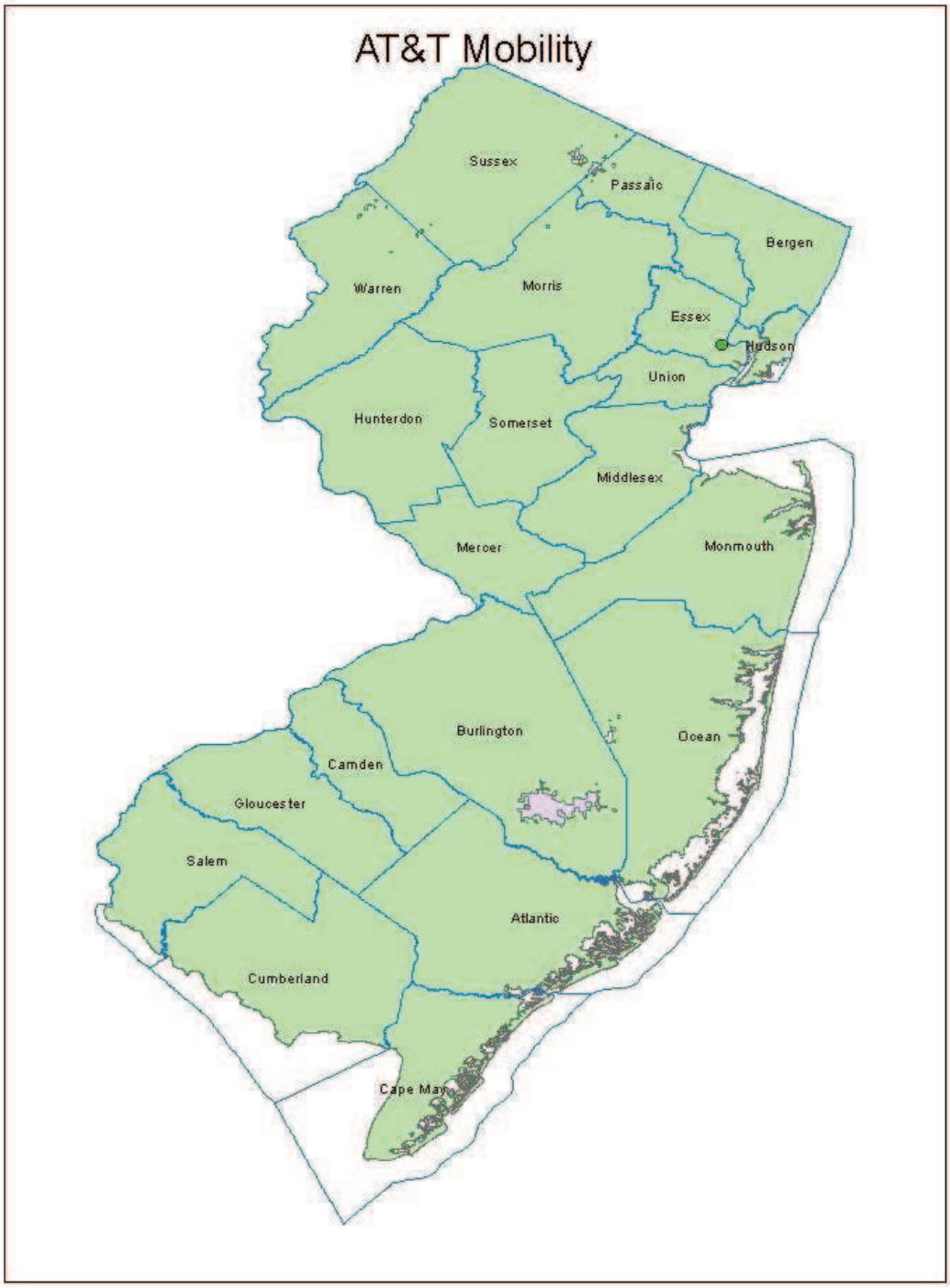
Greg

Gregory G. Wagner
(210)246-8157

Note: This e-mail message is confidential and intended only for the named recipient(s) above. It contains information that may be privileged, attorney work product, or exempt from disclosure under applicable law. If you have received this message in error, or are not the named recipient(s), please immediately notify me at (210)246-8157 and delete this e-mail message from your computer. Thank you.

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



Connecting New Jersey - Broadband Provider Data Report

Provider: Cablevision
Received: January 2013
Submission date: April 2013

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Sections:

1. NDA Status
2. Submission Overview
3. Submission File Details
4. Data Validations and Results
5. Data Transformation and Loading
6. Clarification Questions and Provider Responses
7. Notes and Open Issues

Section 1: NDA Status

Executed with NJ OIT.

Section 2: Submission Overview

AVAILABILITY DATA		
ID	Provider name "Doing business as" name FRN Holding company name Holding company number	CSC HOLDINGS INC CABLEVISION / LIGHTPATH 0003735909, 0003510195 CSC Holdings, Inc. 130370
FOR WIRELINE		
Filetypes	Shapefile with Census Block Year 2010 data	
File size	Multiple tables and shapes, for cable modem and optical (Lightpath) technologies.	

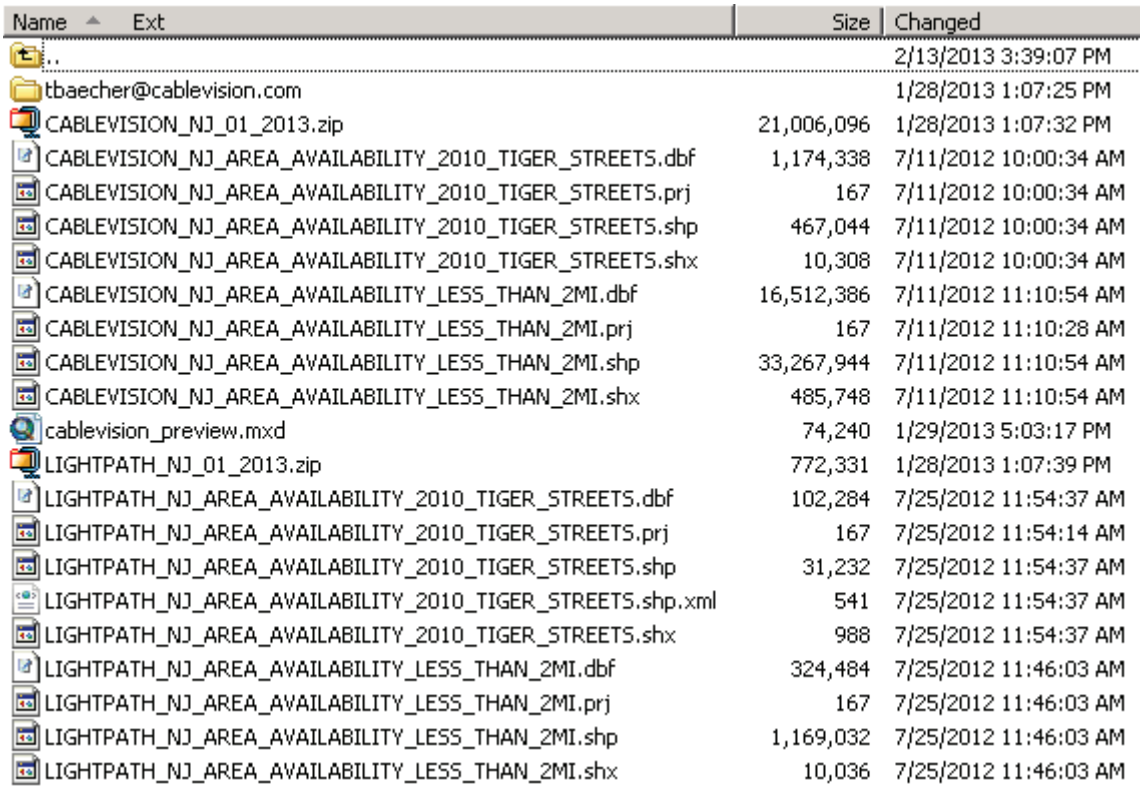
Speeds

Type		Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)
Typical-upstream		Not provided
Typical-downstream		Not provided
Advertised-upstream		Census block and street segment
Advertised-downstream		Census block and street segment

	Subscriber-weighted-up		Not provided	
	Subscriber-weighted-down		Not provided	
Technology Type	40 (Cable Modem DOCSIS3.0), 41 (Cable Modem - Other), 50 (Optical carrier)			
End-user specification	Yes. Address data provided in 2 shape files (for both cable and optical) with street segment ID. (a field is called TLID, which is assumed means Tiger Line ID).			
Comments: Street data is comprised solely of polylines in the shapefile while the other files are polygons representing coverage. No subscriber weighted data found.				
INTERCONNECTION DATA: PROVIDED AFTER REQUEST				
ID				
File size				
Ownership				
Transport Type				
Data Rates/Capacity				
Location				
Comments: None.				

Section 3: Submission File Details

Received one (1) file by SECURE UPLOAD. The zip archive contains four shapefiles: small census blocks (Cablevision and Lightpath), and roadsegments (Cablevision and Lightpath). The data and shapes appear to use Year 2010 Census Bureau geometry. The shapefiles use the XY Coordinate System GCS_North_American_1983.
Files have the date of July 2012, but since the comparison of shapes is not an easy task, the decision was made to consider them a legitimate new submission.



Name	Ext	Size	Changed
..			2/13/2013 3:39:07 PM
tbaecher@cablevision.com			1/28/2013 1:07:25 PM
CABLEVISION_NJ_01_2013.zip		21,006,096	1/28/2013 1:07:32 PM
CABLEVISION_NJ_AREA_AVAILABILITY_2010_TIGER_STREETS.dbf		1,174,338	7/11/2012 10:00:34 AM
CABLEVISION_NJ_AREA_AVAILABILITY_2010_TIGER_STREETS.prj		167	7/11/2012 10:00:34 AM
CABLEVISION_NJ_AREA_AVAILABILITY_2010_TIGER_STREETS.shp		467,044	7/11/2012 10:00:34 AM
CABLEVISION_NJ_AREA_AVAILABILITY_2010_TIGER_STREETS.shx		10,308	7/11/2012 10:00:34 AM
CABLEVISION_NJ_AREA_AVAILABILITY_LESS_THAN_2MI.dbf		16,512,386	7/11/2012 11:10:54 AM
CABLEVISION_NJ_AREA_AVAILABILITY_LESS_THAN_2MI.prj		167	7/11/2012 11:10:28 AM
CABLEVISION_NJ_AREA_AVAILABILITY_LESS_THAN_2MI.shp		33,267,944	7/11/2012 11:10:54 AM
CABLEVISION_NJ_AREA_AVAILABILITY_LESS_THAN_2MI.shx		485,748	7/11/2012 11:10:54 AM
cablevision_preview.mxd		74,240	1/29/2013 5:03:17 PM
LIGHTPATH_NJ_01_2013.zip		772,331	1/28/2013 1:07:39 PM
LIGHTPATH_NJ_AREA_AVAILABILITY_2010_TIGER_STREETS.dbf		102,284	7/25/2012 11:54:37 AM
LIGHTPATH_NJ_AREA_AVAILABILITY_2010_TIGER_STREETS.prj		167	7/25/2012 11:54:14 AM
LIGHTPATH_NJ_AREA_AVAILABILITY_2010_TIGER_STREETS.shp		31,232	7/25/2012 11:54:37 AM
LIGHTPATH_NJ_AREA_AVAILABILITY_2010_TIGER_STREETS.shp.xml		541	7/25/2012 11:54:37 AM
LIGHTPATH_NJ_AREA_AVAILABILITY_2010_TIGER_STREETS.shx		988	7/25/2012 11:54:37 AM
LIGHTPATH_NJ_AREA_AVAILABILITY_LESS_THAN_2MI.dbf		324,484	7/25/2012 11:46:03 AM
LIGHTPATH_NJ_AREA_AVAILABILITY_LESS_THAN_2MI.prj		167	7/25/2012 11:46:03 AM
LIGHTPATH_NJ_AREA_AVAILABILITY_LESS_THAN_2MI.shp		1,169,032	7/25/2012 11:46:03 AM
LIGHTPATH_NJ_AREA_AVAILABILITY_LESS_THAN_2MI.shx		10,036	7/25/2012 11:46:03 AM

Section 4: Data Transformation and Loading

NTIA Table BB_ConnectionPoint_MiddleMile

Since data was not provided for the April 2013 submission, the April 2012 data was copied.

The following describes how the data was loaded in previous submission.
Loaded from data supplied in the XLS sheet. Only one row describes a connection point in New Jersey. The following table explains the transformations that were applied.

Table Column	Data Source / Transformation

PROVNAME	Set to “CSC HOLDINGS INC”
DBANAME	Set to “CABLEVISION”
FRN	As supplied in column frn_name
OWNERSHIP	Set to code 1, leased
BHCAPACITY	Set to code 4; 1gbps falls in range 600mbps – 2.4gbps
BHTYPE	Set to code 1, fiber
LATITUDE	Obtained by geocoding the address
LONGITUDE	Obtained by geocoding the address
ELEVFEET	Set to “0” (zero)
STATEABBR	Set to “NJ”
FULLFIPSID	ID of containing census block from Year 2010 Census Bureau TigerLine reference data
SHAPE	Point shape created using ESRI ArcDesktop

Internal notes on processing:

8. Reused the table created for the October 2010 submission, but mapped Lat/Long to 2010 census block.
9. Since the data was not provided for the April 2012, the October 2010 data was reused.

NTIA Table BB_Service_CensusBlock

Loaded from the two supplied feature classes (shapefiles) with census blocks, one for Cablevision and one for LightPath. The following table explains the transformations that were applied to load the target table. The Cablevision has 60,706 records and LightPath has 1,242 records.

Table Column	**Data Source / Transformation**
PROVNAME	As supplied in column proname
DBANAME	As supplied in column dbaname
PROVIDER_TYPE	Set to 1
FRN	As supplied in column frn
STATEFIPS	Set to “34” (NJ)
COUNTYFIPS	Populated from cenblock (digits 3-5)
TRACT	Populated from cenblock (digits 6-11)
BLOCKID	Populated from cenblock (digits 12-15)
FULLFIPSID	As supplied in column cenblock
TRANSTECH	As supplied - For Cablevision: column trechtrans2 - For Lightpath: column techtrans
MAXADDOWN	As supplied in column maxaddnsp
MAXADUP	As supplied in column maxadupsp
TYPICDOWN	Set to null, not supplied
TYPICUP	Set to null, not supplied

ENDUSERCAT	Set to null, not supplied
SHAPE	As supplied in column shape

Internal processing notes:

1. Import the features with XY Coordinate System " GCS_North_American_1983" via the following three-step process. (A simple Import using ArcCatalog yields an incompatible tolerance value.)
    a. First, copy the data from the shapefiles to the geodatabase using a geographic transformation “NAD_1983_to_WGS_1984_5”. This yields feature classes with the required coordinate system but an incorrect tolerance value. Names are "cv_nj_ar_av_cb_lt_2mi_wgs" and "lp_nj_ar_av_cb_lt_2mi_wgs".
    b. Second, create new feature classes with the same schema as the provided shapefile feature classes and the required coordinate reference system (GCS_WGS_1984) and tolerance (0.000000002 degrees). Names are " cv_nj_ar_av_cb_lt_2mi _wgs_tol" and "lp_nj_ar_av_cb_lt_2mi _wgs_tol".
    c. Third, load the data into the newly created feature classes to ensure perfect compatibility with the required coordinate reference system and tolerance.
2. Ignored the column "techtrans1" in the Cablevision feature class. The presence of two transport technologies indicates that they can support both DOCSIS 3.0 and Other on the all lines.
3. All of the cenblock values correspond to valid Year 2010 Census Block IDs.
4. All census blocks were confirmed to be less than 2 square miles.
5. There were no duplicates in terms of census block and transtech.

NTIA Table BB_Service_RoadSegment

Loaded from the two supplied features with line segments. The following table explains the transformations that were applied to load the target table. The Cablevision has 1,276 records and Lightpath has 111 records.

Table Column	**Data Source / Transformation**
PROVNAME	As supplied in column prvd_name
DBANAME	As supplied in column dba_name
PROVIDER_TYPE	Set to 1
FRN	As supplied in column frn_name
ADDMIN	Set to the least of the non-empty address numbers
ADDMAX	Set to the greatest of the non-empty address numbers
PREDIR	Set to null (no value supplied)
STREETNAME	As supplied (has all street components, not just name)
STREETTYPE	Set to null (no value supplied)
SUFFDIR	Set to null (no value supplied)
CITY	Set to null (no value supplied)

STATECODE	Set to “NJ”
ZIP5	Set to null (no value supplied)
ZIP4	Set to null (no value supplied)
TRANSTECH	As supplied in column tech_trans
MAXADDOWN	As supplied in column max_ad_dwn
MAXADUP	As supplied in column max_ad_up
TYPICDOWN	Set to null (no value supplied)
TYPICUP	Set to null (no value supplied)
SHAPE	As supplied

Internal processing notes:

1. Feature classes were imported exactly as discussed above for table BB_Service_CensusBlock.
2. Ignored the column "techtrans1" in the Cablevision feature class. The presence of two transport technologies indicates that they can support both DOCSIS 3.0 and Other on the all lines.
3. Three records in the Cablevision set were determined to be duplicates, in terms of county and Tiger Line ID. One record in the Lightpath set was found to be duplicate. These records were discarded. 1383 records were loaded.

Section 5: Clarification Questions and Responses

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Tuesday, February 21, 2012 10:14 PM
To: 'tbaecher@cablevision.com'
Cc: 'NJ Broadband Data Collection'
Subject: NJ Broadband Clarification

Ted,

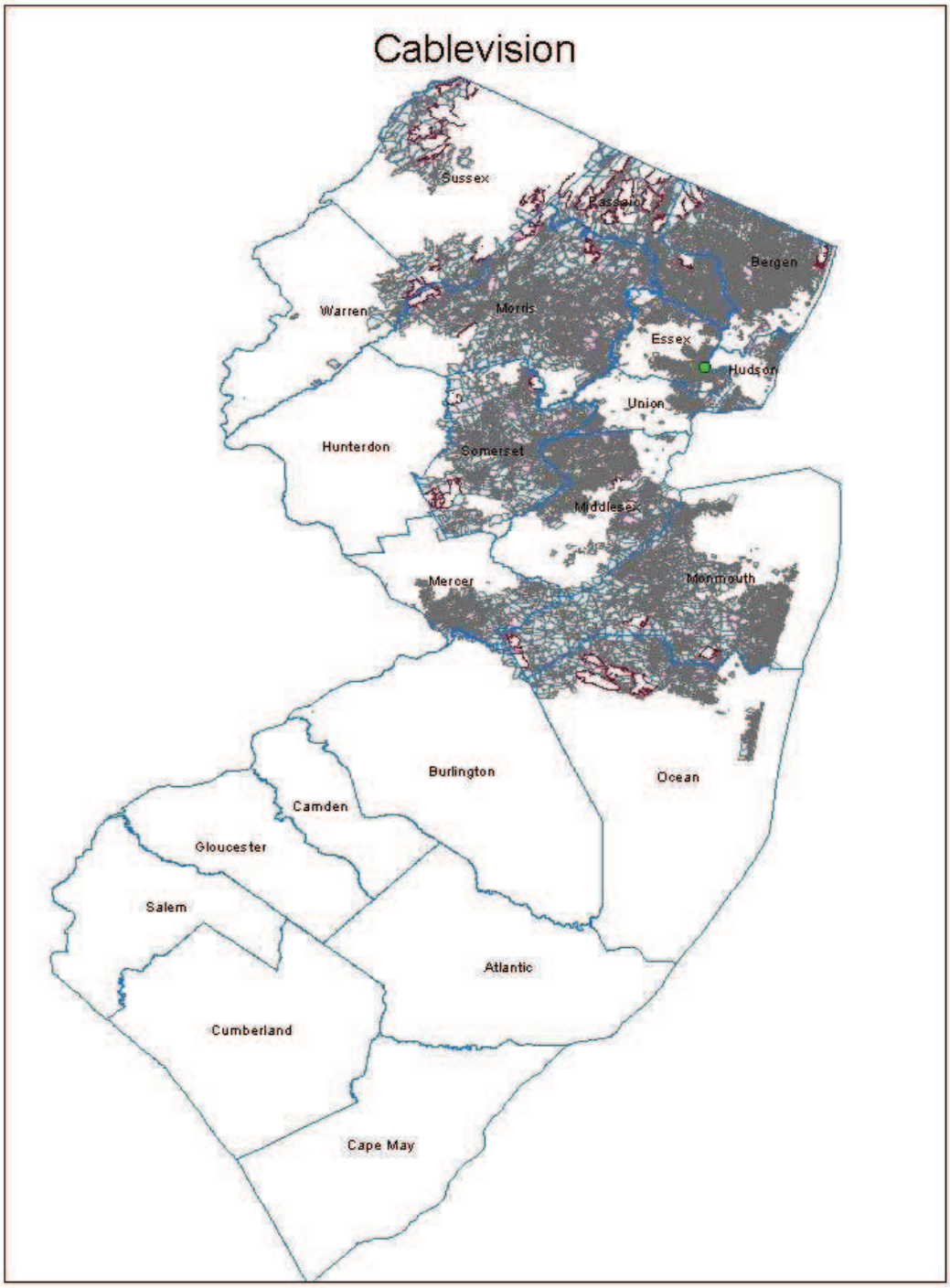
We have performed our initial review of the data you submitted and we have a clarification question. Your recent submission did not include any middle mile information. The last middle-mile data you submitted is from a year ago. Is that data still valid? If not, could you please supply us with revised information?

Thanks for your cooperation.

John Wullert
Manager - NJ BB Data Collection
Applied Communication Sciences
732-699-2687

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



Connecting New Jersey - Broadband Provider Data Report

Provider: CenturyTel DBA Century Link
Received: January 2013
Submission date: April 2013

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Sections:

8. NDA Status
9. Submission Overview
10. Submission File Details
11. Data Validations and Results
12. Data Transformation and Loading
13. Clarification Questions and Provider Responses
14. Notes and Open Issues
15. Overview Map of Submitted Data

Section 1: NDA Status

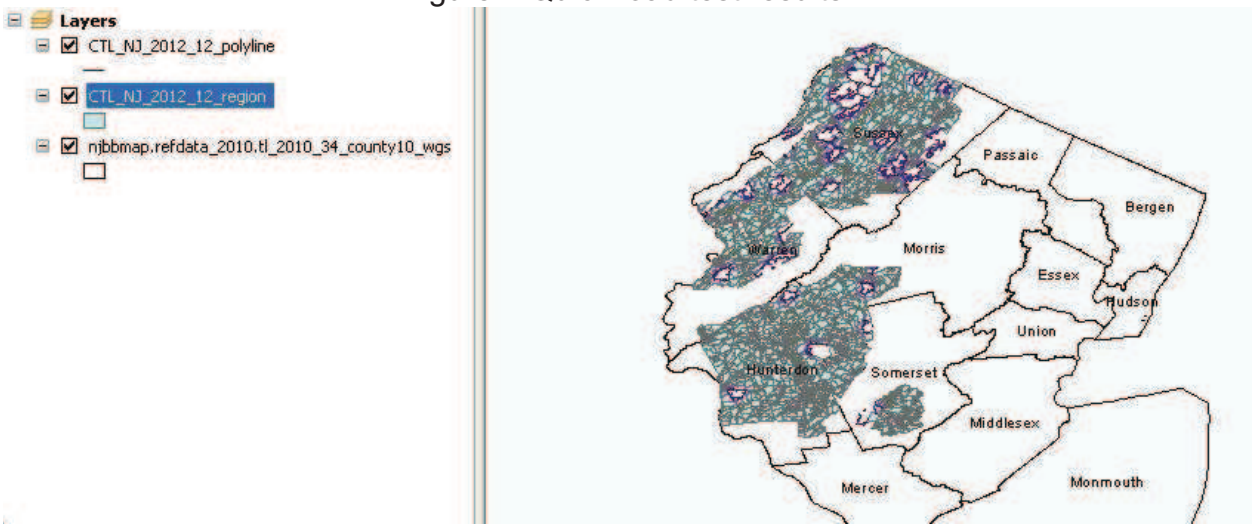
Century Link executed an NDA with NJ OIT; the data files refer to the NDA.

Section 2: Submission Overview

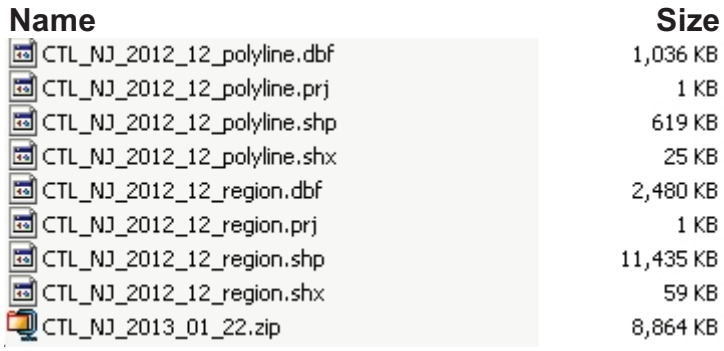
<table>
<tr><th colspan="4">AVAILABILITY DATA</th></tr>
<tr><td rowspan="3">ID</td><td colspan="2">Provider name</td><td>CenturyLink, Inc. (per email)</td></tr>
<tr><td colspan="2">“Doing business as” name</td><td>Century Link</td></tr>
<tr><td colspan="2">FRN</td><td>0018626853</td></tr>
<tr><th colspan="4">FOR WIRELINE</th></tr>
<tr><td>Filetypes</td><td colspan="3">Shapefiles “CTL_NJ_2012_12_polyline” and “CTL_NJ_2012_12_region”</td></tr>
<tr><td>File size</td><td colspan="3"></td></tr>
<tr><td>Speeds</td><td colspan="3"><table>
<tr><th>Type</th><th></th><th>Spatial Resolution: county</th></tr>
<tr><td>Typical-upstream</td><td></td><td>Census block and street segment</td></tr>
<tr><td>Typical-downstream</td><td></td><td>Census block and street segment</td></tr>
<tr><td>Advertised-upstream</td><td></td><td>Census block</td></tr>
<tr><td>Advertised-downstream</td><td></td><td>Census block</td></tr>
<tr><td>Subscriber-weighted-up</td><td></td><td>Not provided</td></tr>
<tr><td>Subscriber-weighted-</td><td></td><td></td></tr>
</table></td></tr>
</table>

	down			
Technology Type	10 (ADSL)			
End-user specification	Not provided			
Comments:				
INTERCONNECTION DATA				
ID				
File size				
Ownership				
Transport Type				
Data Rates/Capacity				
Location				
Comments: Middle-mile data was not provided this submission.				

Figure1. Quick load test results



Section 3: Submission File Details



Name	Size
CTL_NJ_2012_12_polyline.dbf	1,036 KB
CTL_NJ_2012_12_polyline.prj	1 KB
CTL_NJ_2012_12_polyline.shp	619 KB
CTL_NJ_2012_12_polyline.shx	25 KB
CTL_NJ_2012_12_region.dbf	2,480 KB
CTL_NJ_2012_12_region.prj	1 KB
CTL_NJ_2012_12_region.shp	11,435 KB
CTL_NJ_2012_12_region.shx	59 KB
CTL_NJ_2013_01_22.zip	8,864 KB

Section 4: Data Validation,Transformation and Loading

NTIA Table BB_ConnectionPoint_MiddleMile

Since the middle mile data is not submitted, we assume that there is no change in this submission. The data is copied from the 2012 October submission.

The following table explains the transformations that were applied in earlier submission.

Table Column	Data Source / Transformation
PROVNAME	Set to “CenturyLink, Inc.” per email
DBANAME	As supplied in DbaName
FRN	As supplied in FRN
OWNERSHIP	As supplied in Own
BHCAPACITY	As supplied in BHCap
BHTYPE	As supplied in BHType
LATITUDE	As supplied in Lat
LONGITUDE	As supplied in Long
ELEVFEET	Set to “0” (zero)
STATEABBR	Set to “NJ”
FULLFIPSID	ID of containing census block from Year 2010 Census Bureau TigerLine reference data
SHAPE	Point shape created using ESRI ArcDesktop

Internal notes on processing:

10. Loaded 1 row of data from Excel Spreadsheet “middlemile_NJ.txt” (1 row) that was supplied for the April 2011 submission. Data in that table had previously been spatially joined to find containing census block.

NTIA Table BB_Service_CensusBlock

Loaded from supplied shapefile feature “CTL_NJ_2012_12_region”. The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	Set to “CenturyLink, Inc.” per email
DBANAME	As supplied in column “dba_name”
PROVIDER_TYPE	Set to 1
FRN	Set to "0018626853"
STATEFIPS	Set to “34” (NJ)
COUNTYFIPS	Populated from census_blo (digits 3-5)
TRACT	Populated from census_blo (digits 6-11)
BLOCKID	Populated from census_blo (digits 12-15)
BLOCKSUBGROUP	Set to null
FULLFIPSID	As supplied in column census_blo
TRANSTECH	As supplied in column technology
MAXADDOWN	Set to 7 for all records
MAXADUP	Set to 4 for all records
TYPICDOWN	Set to null
TYPICUP	Set to null
SHAPE	As supplied

Internal notes on processing

10. Differently from the 2012 April submission, the supplied shapes use geographic coordinate system GCS_North_American_1983. The NTIA data model requires coordinate system GCS_WGS_1984. To change the projection we applied the ESRI geographic transformation NAD_1983_To_WGS_1984_5 (per ESRI KB article 24159). The resulting table is named with suffix “_wgs”.
11. We had to create a new feature class and reload the data so that the tolerance value matches the NTIA transfer model’s tolerance value exactly, resulting in a feature class with a suffix of “_tol”.
12. Shapefile (feature class) CTL_NJ_2012_12 _region provides coverage data for census blocks with an area less than or equal to 2 square miles. It contains 7,422 records. All of the IDs shown in the shapefile correspond to valid Year 2010 Census Block IDs and all are smaller than 2 square miles. (TBD by Arroyo)
13. The feature class "region" has 288 rows with duplicate census block IDs and identical technology codes (confusingly the speeds are different for the some of these duplicates). We discarded these to avoid creating duplicate shapes in the table.
14. The feature class has 11 rows with technology 10 and downstream speed code 8. This combination produced a validation warning. The provider could not confirm that these values were correct, but asserted that all areas were covered with speed tiers 7 down and 4 up. We changed the speed tiers on these values to 7/4.
15. We loaded 7134 records into the bb table.

NTIA Table BB_Service_RoadSegment

Loaded from supplied shapefile feature “CTL_NJ_2012_12_polyline”. The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	Set to “CenturyLink, Inc.” per email
DBANAME	As supplied in column “dba_name”
PROVIDER_TYPE	Set to 1
FRN	Set to "0018626853"
ADDMIN	Set to the least of the non-empty address numbers
ADDMAX	Set to the greatest of the non-empty address numbers
PREDIR	Set to null (no value supplied)
STREETNAME	As supplied
STREETTYPE	Set to null (no value supplied)
SUFFDIR	Set to null (no value supplied)
CITY	Set to null (no value supplied)
STATECODE	Set to “NJ”
ZIP5	Set to null (no value supplied)
ZIP4	Set to null (no value supplied)
TRANSTECH	As supplied
MAXADDOWN	Set to 7
MAXADUP	Set to 4
TYPICDOWN	Set to null
TYPICUP	Set to null
TLID	Set to Null – not supplied
SHAPE	As supplied

Internal notes on processing:

1. Shapefile (feature class) CTL_NJ_2012_12 _polyline shows street segments for census blocks larger than 2 square miles. In contained 3098 records.
2. Differently from the 2012 April submission, the supplied shapes use geographic coordinate system GCS_North_American_1983. The NTIA data model requires coordinate system GCS_WGS_1984. To change the projection we applied the ESRI geographic transformation NAD_1983_To_WGS_1984_5 (per ESRI KB article 24159). The resulting table is named with suffix “_wgs”.
3. We had to create a new feature class and reload the data so that the tolerance value matches the NTIA transfer model’s tolerance value exactly, resulting in a feature class with a suffix of “_tol”.
4. We checked for uniqueness using the county number, street name, min and max address and the string portion of the shape object. Including the string description of the shape object had the effect of including the number of points in the shape as part of the uniqueness test. We discarded 1319 records as duplicates using this method. There is a chance that this discarded some non-duplicates, but our manual inspection of the data made it appear valid.
5. Based on provider instructions that they have 10 Mbps coverage in all their NJ exchanges, we set all down/up advertised speeds to 7/4.

6. We loaded 1779 rows.

Validation rules produced a warning on 7134 census blocks and 1779 street segments for the combination of a downstream speed code of 7 (10-25 Mbps) with a transtech code of 10 (ADSL). The provider had originally reported speeds exceeding 25 Mbps, or a speed code of 8. When we questioned these, the provider could not confirm those values, but asserted that all areas were covered with speeds exceeding 10 Mbps.

Section 5: Questions

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Friday, March 09, 2012 6:42 AM
To: Flurer, Gerry F
Cc: NJ Broadband Data Collection
Subject: NJBB Data Clarification - CenturyLink

Gerry,
We have reviewed the data you submitted and have a few questions:

1. The NTIA wants us to verify cases where speeds over 10 Mbps are reported for DSL. You reported instances of download speeds in the 10-25 Mbps and 25-50 Mbps for your DSL service. Are these correct values?
2. In previous rounds, you had submitted a single middle mile point. Do you have updated information, or should we use that same data for this round?
3. In prior submissions, your street-segment data included the TigerLine ID of each segment. Is it possible for you to include that information this round?

We appreciate your participation in the program.

John Wullert
Manager - NJ BB Data Collection
Applied Communication Sciences
732-699-2687

From: Flurer, Gerry F [mailto:Gerald.F.Flurer@CenturyLink.com]
Sent: Friday, March 09, 2012 10:59 AM
To: NJ Broadband Data Collection
Cc: Bonsick, David
Subject: RE: NJBB Data Clarification - CenturyLink

John: See response inserted, below.

Gerry Flurer

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Friday, March 09, 2012 6:42 AM
To: Flurer, Gerry F
Cc: NJ Broadband Data Collection
Subject: NJBB Data Clarification - CenturyLink

Gerry,
We have reviewed the data you submitted and have a few questions:

1. The NTIA wants us to verify cases where speeds over 10 Mbps are reported for DSL. You reported instances of download speeds in the 10-25 Mbps and 25-50 Mbps for your DSL service. Are these correct values?

[G. Flurer] Yes. CTL uses ADSL2 and VDSL2 in certain areas to achieve those speeds.

2. In previous rounds, you had submitted a single middle mile point. Do you have updated information, or should we use that same data for this round?

[G. Flurer] No updates for that data.

3. In prior submissions, your street-segment data included the TigerLine ID of each segment. Is it possible for you to include that information this round?

[G. Flurer] In several other states we found Tiger ID data from Pitney Bowes to be invalid. For this round we adopted the use of the TIGER street data. I'm looking at possibly including the TIGER ID in future submissions.

We appreciate your participation in the program.

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Friday, March 09, 2012 10:08 AM
To: Flurer, Gerry F
Cc: NJ Broadband Data Collection
Subject: RE: NJBB Data Clarification - CenturyLink

Gerry,
Thanks for the quick response. Can you give us any sense of where you have the ADSL2/VDSL2 operational? The NTIA would prefer not to overstate capabilities.

Thanks,

John

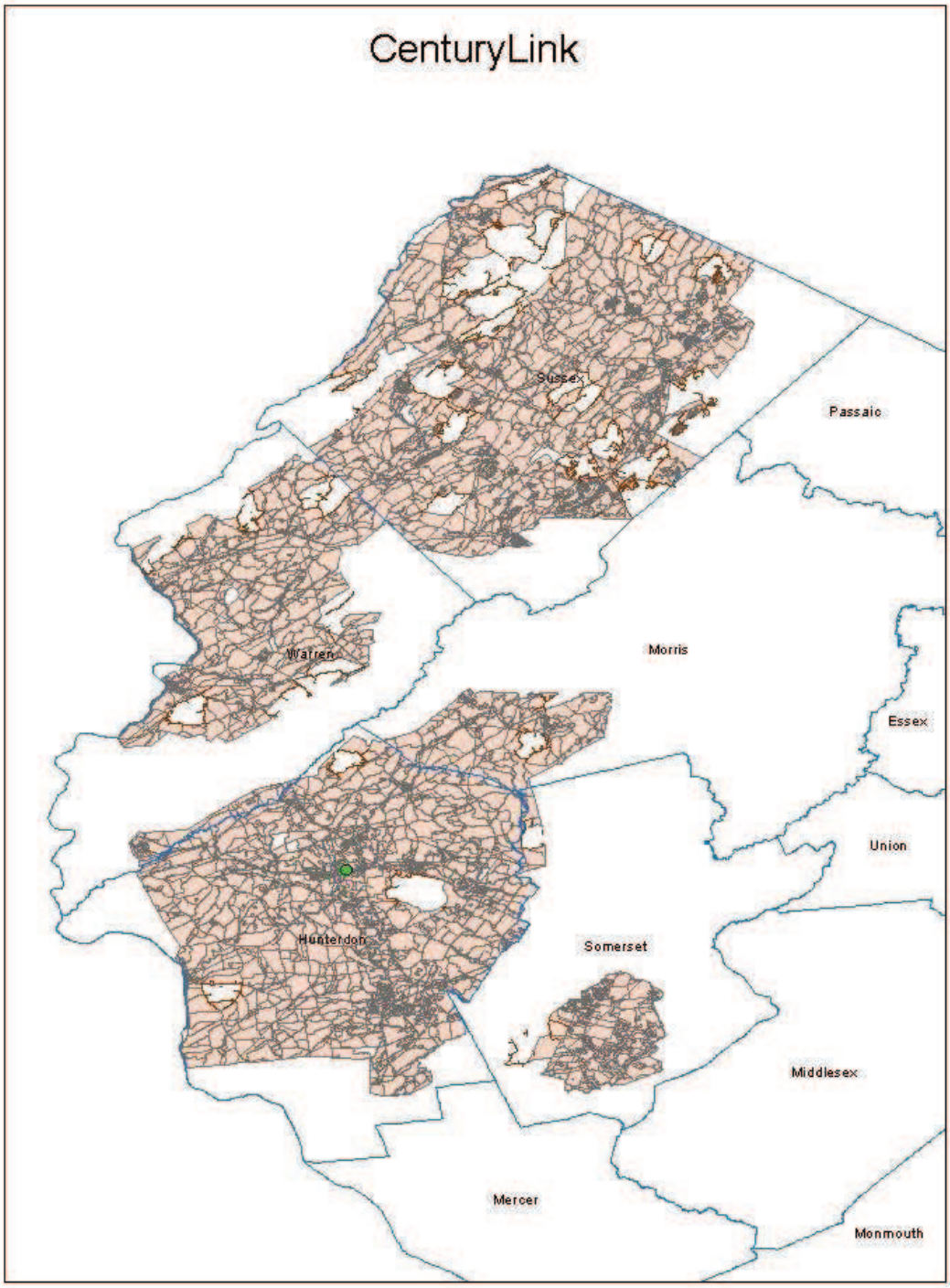
From: Flurer, Gerry F [mailto:Gerald.F.Flurer@CenturyLink.com]
Sent: Friday, March 09, 2012 11:58 AM
To: NJ Broadband Data Collection
Subject: RE: NJBB Data Clarification - CenturyLink

John: We have 10 mbps service available in all our NJ exchanges. The few spots we have listed as Speed Tier 8 look pretty remote to me. I'll have to check into them more specifically. For now, though, can we consider them as a lower speed tier for this round? Let's make them tier 7 and I'll look into them for the next round.

Gerry Flurer

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



Connecting New Jersey - Broadband Provider Data Report

Provider: Clearwire
Received: January 2013
Submission date: April 2013

This report presents details on processing of broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

Unknown

Section 2: Submission Overview

<table>
<tr><th colspan="4">AVAILABILITY DATA</th></tr>
<tr><td>ID</td><td colspan="2">PROVIDER NAME
DBA NAME
FRN
Holding company name:
Holding company number:</td><td>Clearwire Corporation
Clearwire Corporation
0017775628</td></tr>
<tr><th colspan="4">FOR WIRELESS</th></tr>
<tr><td>Filetypes</td><td colspan="2">shapefile collection: shp/dbf/prj/shx, mdb, gdb, imagefile etc.</td><td>The shape file contains 520 polygon shapes, as well as an attribute, ID_UNIQUE (6 digit number)</td></tr>
<tr><td>Speeds</td><td colspan="2"><table><tr><th>Type</th><th>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode)</th></tr><tr><td>Upstream max adv</td><td>no.</td></tr><tr><td>Downstream max adv</td><td>no.</td></tr><tr><td>Upstream typical</td><td>no.</td></tr><tr><td>Downstream typical</td><td>no.</td></tr><tr><td>Subscriber-weighted</td><td>no.</td></tr></table></td><td>This data was not included with submitted shape file, but advertised speed, technology and spectrum data from prior rounds was verified with provider.</td></tr>
<tr><td>Technology Type</td><td colspan="2">Spectrum : no</td><td></td></tr>
<tr><td colspan="4">Comments:</td></tr>
<tr><th colspan="4">INTERCONNECTION DATA</th></tr>
</table>

ID	
File size	
Ownership	
Transport Type	
Data Rates/Capacity	
Location	
Comments: no IC data provided.	

Section 3: Submission File Details

Received the zip file by email

Size	Name
3745KB	NJ_WiMAX_123112_region.zip

The1 zip file containing 6 files:

Name	Size
NJ_WiMAX_123112_region.dbf	14 KB
NJ_WiMAX_123112_region.prj	1 KB
NJ_WiMAX_123112_region.shp	5,933 KB
NJ_WiMAX_123112_region.shx	5 KB

Section 4: Data Validation,Transformation and Loading

NTIA Table BB_Service_Wireless

Loaded from the supplied shapefiles as augmented by email and phone conversations. The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	Set to “Clearwire Corporation” per email
DBANAME	Set to “Clearwire Corporation” per email
FRN	Set to “0017775628”
TRANSTECH	Set to “80” (terrestrial mobile wireless) based on statement of WiMAX
SPECTRUM	Set to “5” per email
MAXADDOWN	Set to “5” (code for range of 3-6Mbps) per email
MAXADUP	Set to “3” (code for range that includes 1Mbps) per email
TYPICDOWN	Set to null

TYPICUP	Set to null
STATEABBR	Set to “NJ”
SHAPE	As supplied.

Internal notes on processing:

16. The shape file contains 520 polygon shapes, as well as an attribute, ID_UNIQUE (a 6 digit number).
17. The supplied shape file uses geographic coordinate system name GCS_WGS_1984. The NTIA data model requires the same coordinate system. No geographic transformation was required. Loaded into our geo-database to feature class name NJ_WiMAX_123112_region.
18. The XY Tolerance value differs on the supplied data from the required NTIA model. Imported the table schema and the table data in two separate operations, thereby ensuring perfect compatibility with the NTIA data model. The table has the suffix “_tol”.
19. The shape extends beyond the NJ State boundary. Clipped the shape using ESRI: Analysis Tools-> Extract -> Clip with, select feature class refdata_2010.tl_2010_34_state10_wgs. The feature class has the suffix "_clip". 269 rows are left after clip operation.
20. Coalesced the single-part polygons into one multi-part polygon using the ArcGIS ESRI: Data Management Tools->Generalization->Dissolve (without choosing anything in the Dissolve_Field(s) option), which resulted in a new feature class with the suffix “_dissolved” with a single row.

Section 5: Clarification Questions and Responses

The email has no info about advertized and typical speed. (7/12/2012)

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Wednesday, February 15, 2012 5:23 PM
To: Tajit Mehta
Cc: ConnectingNJ@groups.appcomsci.com
Subject: RE: NJ Broadband Data Collection - Spring 2012

Taj,
A few additional questions regarding the service you deliver over the covered area. From your previous submissions, we have the following information:

Provider Name = Clearwire Corporation
FRN = "0017775628"
Transmission technology = 80 (wireless)
spectrum = 5 (Broadband Radio Service/Educational Broadband Service spectrum (2496-2690 MHz))
Maximum Advertised Download Speed = "5" (Greater than or equal to 3 mbps and less than 6 mbps)
Maximum Advertised Upload Speed = "3" (Greater than or equal to 768 kbps and less than 1.5 mbps)

Are these values still accurate?

John Wullert
Manager - NJ BB Data Collection
Applied Communication Sciences
732-699-2687

From: Tajit Mehta [mailto:tajit.mehta@clearwire.com]
Sent: Wednesday, February 15, 2012 5:24 PM
To: NJ Broadband Data Collection
Subject: RE: NJ Broadband Data Collection - Spring 2012

Hi John,

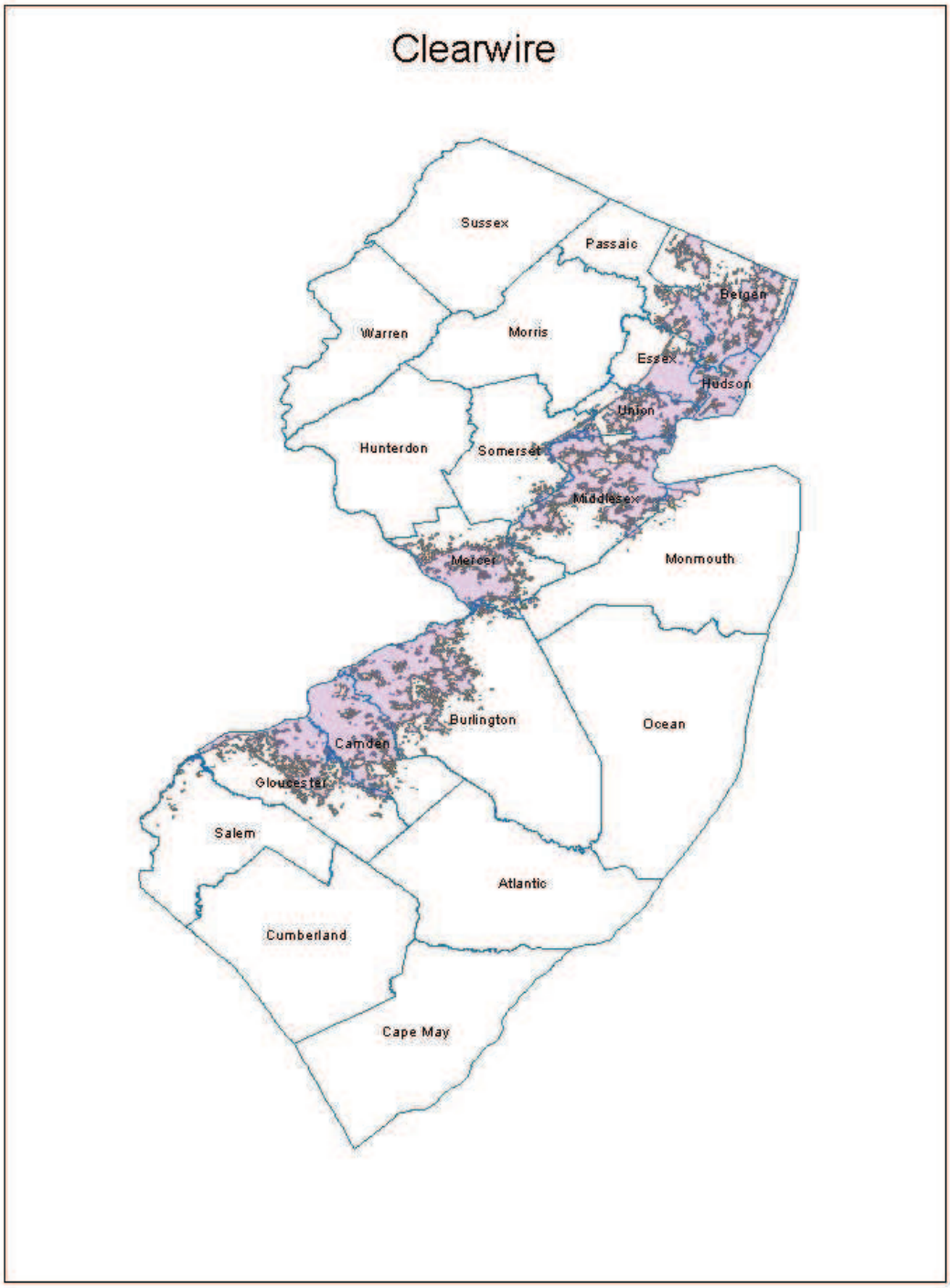
Yes the date stays the same.

Regards,
Taj

Taj Mehta – clearwire - Spectrum Development
593 Herndon Parkway, Herndon, VA 20170 - Office 571-490-8577 - Mobile 571-220-4657 – Fax 571-490-8491

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



Broadband Provider Data Report

Provider: Cogent Communications
Received: February 2013
Submission date: April 2013

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Sections:

16. NDA Status
17. Submission Overview
18. Submission File Details
19. Data Validations and Results
20. Data Transformation and Loading
21. Clarification Questions and Provider Responses
22. Notes and Open Issues

Section 1: NDA Status

No NDA was executed. All data were taken from the provider's public web site, FCC filings and/or information supplied by the provider via email

Section 2: Submission Overview

<table>
<tr><td colspan="4">MAPPING DATA</td></tr>
<tr><td>ID</td><td colspan="2">Provider name
“Doing business as” name
FRN</td><td>Cogent Communications, Inc.
Not provided
0019898303</td></tr>
<tr><td colspan="4">FOR WIRELINE</td></tr>
<tr><td>Filetypes</td><td colspan="2">Txt, xls, pdf, etc.</td><td>Email and pointers to Web site and SEC filings</td></tr>
<tr><td>File size</td><td colspan="2">Number of records, data elements</td><td>List of 23 addresses where they offer service</td></tr>
<tr><td>Speeds</td><td>Type</td><td>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode)</td><td rowspan="6">Provided building addresses. Adver down and up are 10/11, very fast.</td></tr>
<tr><td></td><td>Adver down</td><td>Address</td></tr>
<tr><td></td><td>Adver up</td><td>Address</td></tr>
<tr><td></td><td>Typical down</td><td>Not provided</td></tr>
<tr><td></td><td>Typica up</td><td>Not provided</td></tr>
<tr><td></td><td>Subscriber-</td><td>Not provided</td></tr>
</table>

	weighted	
Technology Type	DOCSIS, xDSL, fiber, etc.	Fiber
End-user specification	Business, consumer, gov't etc	
Comments: They offer service directly to businesses at the addresses they provided. They are a reseller of broadband access to businesses at other locations. They had previously refused to provide data on Typical and Subscriber Weighted speeds.		
INTERCONNECTION DATA		
ID	Provider name "Doing business as" name FRN	
File size	Number of records, data elements	
Ownership	Leased/owned	
Transport Type	Fiber, wireless, copper	
Data Rates/Capacity		
Location	Street address, lat/lon, elevation	
Comments: We had previously extracted data for Middle Mile sites, based on the assumption that Cogent's Data Centers were interconnection points. We were instructed by the provider that these sites did not meet the definition of Middle Mile sites and thus should be removed.		
DATA COMPLETENESS		
Data Validation/ Verification		

Section 3: Submission File Details

Data received and processed in previous submissions was updated (address information) via a query of "Service Locations" from provider's Web site (http://www.cogentco.com/?lang=en&option=com_content&view=article&id=40&action=search). The CDNC field together with information obtained in previous rounds were used to determine the advertised speeds. Data was stored in the file Cogent_ServiceLocations_201304.xls.

Section 4: Validations and Results

During previous rounds provider reported data rates were confirmed with their published information and SEC filings.

The only other validation to be done is whether each address can be successfully geocoded. See next section. One address is not

Section 5: Data Transformation and Loading

The standard NDA prohibits us from submitting address-level data to the NTIA. Instead, we discover the census block for each customer address, then report the census block shape drawn from Census Bureau TigerLine reference data.

NTIA Table BB_Service_CensusBlock

We copied the information to a spreadsheet. The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	Set to “Cogent Communications, Inc.”
DBANAME	Same as PROVNAME
PROVIDER_TYPE	Set to 1
FRN	Set to “0019898303”
STATEFIPS	Set to “34” (NJ)
COUNTYFIPS	Populated from Census Block FIPS Code (first 3 digits)
TRACT	Populated from Census Block FIPS Code (next 6 digits)
BLOCKID	Populated from Census Block FIPS Code
BLOCKSUBGROUP	Set to null
FULLFIPSID	Populated from Census Block FIPS Code
TRANSTECH	Set to “50”
MAXADDOWN	Populated from column “Maximum Advertised Speed Down”
MAXADUP	Populated from column “Maximum Advertised Speed Up
TYPICDOWN	Set to null
TYPICUP	Set to null
SHAPE	Copied from Census Bureau TigerLine 2010, as matched by spatial join on geocoded address

Internal processing notes:

11. Geocoded the addresses using the Google geocoder to obtain a Latitude, Longitude pair for each..
12. Created an excel sheet and imported it to a geodatabase table.
13. Added point shapes corresponding to each Latitude, Longitude pair by creating a feature class from the table using ArcCatalog’s “Create Feature Class from XY Table” option.
14. Added a column containing the ID of the containing year 2010 census block via a spatial join of the point shapes and the census block shapes from reference data.
15. Discarded 7 rows with duplicate census blocks.

Section 6: Clarification Questions and Responses

From: Zulager, Ried [mailto:RZulager@Cogentco.com]
Sent: Thursday, July 07, 2011 11:11 AM
To: Wullert, John R II
Subject: For your information: NJ Broadband Data Collection

Fine. The website may have changed slightly, but you can still get a list of address locations fairly easily from Cogent's public facing data. Just limit your searches to NJ as the jurisdiction of interest.

http://www.cogentco.com/en/network/service-locations

Ried Zulager
Corporate Secretary
Cogent Communications Group, Inc.
1015 31st St. NW
Washington, DC 20007
tel: +1-202-295-4274
rzulager@cogentco.com

From: NJ Broadband Data Collection [mailto:ConnectingNJ@research.telcordia.com]
Sent: Tuesday, March 01, 2011 4:45 PM
To: 'Zulager, Ried'
Cc: ConnectingNJ@research.telcordia.com
Subject: RE: NJ BB Data Collection - Spring 2011
Sensitivity: Private

Ried,
The attached spreadsheet integrates the data you submitted to us last year with and the data we could obtain from your Web site and SEC filings. We will use this data as the basis for the submission to the NTIA. If you have any comments or corrections on the data, please let me know.
We did notice that the "Service Location" form on your Web site did not return a valid zip code for the 5851 Westside Ave in North Bergen. We assigned an zip code of 07047 based on a Google search.
Of the data requested by NTIA, we were not able to obtain data on Typical speeds and the Subscriber Weighted Nominal Speed. You indicated last time that you were not prepared to offer this information. If your position on this matter has changed, we would be happy to receive the data.

Thanks for your cooperation

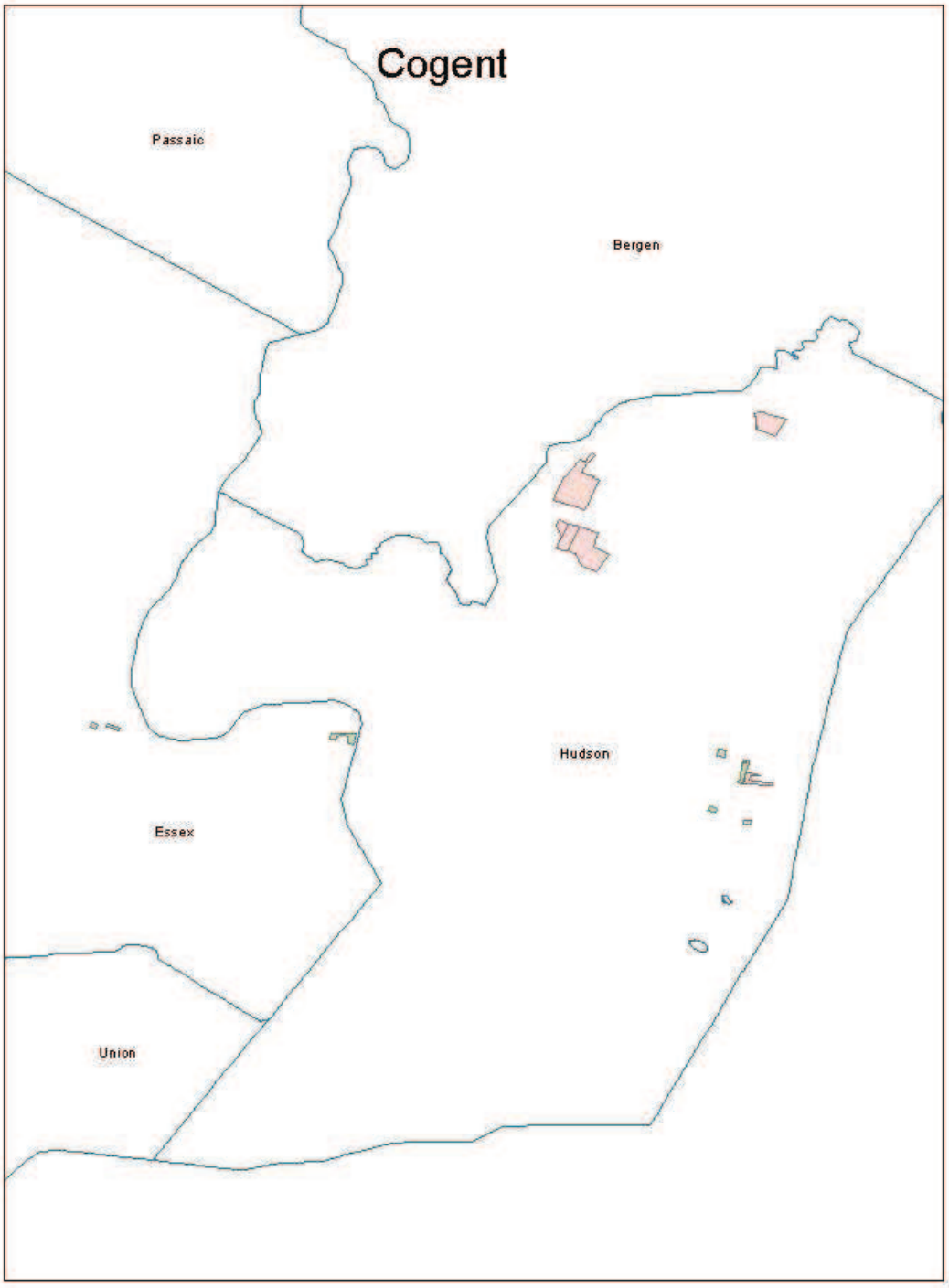
John Wullert
Manager – NJ BB Data Collection
Telcordia Technologies
732-699-2687

From: Zulager, Ried [mailto:RZulager@Cogentco.com]
Sent: Tuesday, March 01, 2011 6:03 PM
To: ConnectingNJ@research.telcordia.com
Subject: RE: NJ BB Data Collection - Spring 2011
Sensitivity: Private

"We did notice that the "Service Location" form on your Web site did not return a valid zip code for the 5851 Westside Ave in North Bergen. We assigned an zip code of 07047 based on a Google search." Seems reasonable; since zip codes are fairly irrelevant to Cogent's business the zip code is not something that hits out A list of priorities in any database – nor is geocode.

Section 7: Notes and Open Issues

Section 8: Overview Map of Submitted Data



Connecting New Jersey - Broadband Provider Data Report

Provider: Comcast
Received: January 2013
Submission date: April 2013

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

Section 2: Submission Overview

<table>
<tr><td colspan="3">AVAILABILITY DATA</td></tr>
<tr><td>ID</td><td>Provider name
“Doing business as” name
FRN</td><td>COMCAST CABLE COMMUNICATIONS LLC
COMCAST
0004-4416-63</td></tr>
<tr><td colspan="3">FOR WIRELINE</td></tr>
<tr><td>Filetypes</td><td colspan="2">Excel files w. Census Block Year 2010 data. Street segment level and CB level availability tables for CB’s less than and greater than 2 sq. mi.</td></tr>
<tr><td>File size</td><td colspan="2">see files</td></tr>
<tr><td>Speeds</td><td colspan="2"><table>
<tr><th>Type</th><th></th><th>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)</th></tr>
<tr><td>Typical-upstream</td><td></td><td>Not provided</td></tr>
<tr><td>Typical-downstream</td><td></td><td>Not provided</td></tr>
<tr><td>Advertised-upstream</td><td></td><td>yes (CBSA/RSA level)</td></tr>
<tr><td>Advertised-downstream</td><td></td><td>yes (CBSA/RSA level)</td></tr>
<tr><td>Subscriber-weighted-up</td><td></td><td>no</td></tr>
<tr><td>Subscriber-weighted-down</td><td></td><td>no.</td></tr>
</table></td></tr>
<tr><td>Technology Type</td><td colspan="2">40 (Cable Modem DOCSIS3.0)</td></tr>
<tr><td>End-user specification</td><td colspan="2">Comcast provides availability at the Census Block and Street Segment level.</td></tr>
<tr><td colspan="3"></td></tr>
<tr><td colspan="3">INTERCONNECTION DATA: PROVIDED AFTER REQUEST</td></tr>
</table>

ID	
File size	
Ownership	
Transport Type	
Data Rates/Capacity	
Location	
Comments:	

Section 3: Submission File Details

Received three (3) files by SECURE UPLOAD.

Size	Name
99KB	34-streets-NJ.xlsx
3535KB	34-blocks-NJ.xlsx
9KB	New Jersey Maximum Advertised Speeds December 31 2012.xlsx

Section 4: Validation, Data Transformation and Loading

NTIA Table BB_Service_CensusBlock

The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	As supplied in column “Provider_Name” but without trailing period
DBANAME	As supplied in column “DBA_NAme”
PROVIDER_TYPE	Set to 1
FRN	As supplied in column “FRN”
STATEFIPS	Set to “34” (NJ)
COUNTYFIPS	Populated from Census_Block_FIPS_Code (first 3 digits)
TRACT	Populated from Census_Block_FIPS_Code (next 6 digits)
BLOCKID	Populated from Census_Block_FIPS_Code (last 4 digits)
FULLFIPSID	As supplied in column Census_Block_FIPS_Code
TRANSTECH	As supplied in column Technology_of_Transmission
MAXADDOWN	Set “10” (see below)
MAXADUP	Set to “9” (see below)
TYPICDOWN	Set to null, not supplied
TYPICUP	Set to null, not supplied
SHAPE	Copied from Census Bureau TigerLine 2010,

	As matched by Census block 2010 ID

Processing notes:

4. File 34-blocks-NJ.xlsx contains 74,719 records. No shape was provided, but a Census Block ID is provided. Every ID is 15 digits long.
5. Census Blocks: Comcast supplied Census 2010 block IDs. We referenced the Census Bureau reference database for Year 2010 to extract and submit geographic features (i.e., shapes) for each census block based on the supplied Census_Block_FIPS_Code.
6. Speeds: Data for maximum advertised down and up speeds were taken from file "New Jersey Maximum Advertised Speeds December 31 2012.xlsx". Comcast listed the same upload speed (9) and download speed (10) for all seven MSAs they serve, technology of transmission was 40 in all cases.

NTIA Table BB_Service_RoadSegment

Loaded as discussed below. The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	Set to "Comcast Cable Communications, LLC"
DBANAME	Set to "Comcast"
PROVIDER_TYPE	Set to 1
FRN	Set to "0004441663"
ADDMIN	Set to the least of the non-empty address numbers for the line segment
ADDMAX	Set to the greatest of the non-empty address numbers for the line segment
PREDIR	Set to null (no value supplied)
STREETNAME	As obtained with the procedure outlined bellow (has all street components, not just name)
STREETTYPE	Set to null (no value supplied)
SUFFDIR	Set to null (no value supplied)
CITY	Set to null (no value supplied)
STATECODE	Set to "NJ"
ZIP5	Set to value of zipl column for the line segment
ZIP4	(no value supplied)
TRANSTECH	As supplied (40)
MAXADDOWN	Set to 10
MAXADUP	Set to 9
TYPICDOWN	Set to null
TYPICUP	Set to null
SHAPE	Copied from Census Bureau TigerLine 2010, As matched by County + Tiger Line ID

File 34-streets-NJ.xlsx contains 991 records. No shape is provided, and no reference ID such as Tiger Line ID is provided either. We cannot validate these segments against reference data, nor can we accurately generate shapes for these segments. Instead we gathered a list of segments in large census blocks based on the municipalities served by Comcast. We processed 3142 street segments.

For municipalities served in their entirety by Comcast, the following approach was used. (Note: steps 1-4 were performed previously and not repeated for this round.)

1. Adjusted the Municipality names provided by Comcast with the following rules to enable matching with official New Jersey Municipality reference data
    a. Changed to upper case
    b. Performed the following string replacements on the Municipality field
        i. TOWNSHIP -> TWP
        ii. BOROUGH -> BORO (only when preceded by a space)
        iii. MT. -> MOUNT
        iv. PT. -> POINT
        v. ORANGE CITY -> CITY OF ORANGE TWP (ORANGE at start of line)
    c. Removed any additional information in parentheses (I.e., appended county name)
2. Performed join between two data sources, using Municipality and County as keys
3. Dropped four military bases that did not match any municipality
4. Generated a file with Municipality, Type, County and Municipal Code
5. Joined this information with the large census blocks for each municipality, and then joined that result with the street segments for each large census block.
6. Loaded the resulting set of street segments and shapes after removing duplicates.

Download Speed

1. Speeds: Data for maximum advertised down and up speeds were taken from file “New Jersey Maximum Advertised Speeds December 31 2012.xlsx”. Comcast listed the same upload speed (9) and download speed (10) for all seven MSAs they serve so these values were used.

Validation rules produced warnings on 74,719 census blocks and 3,142 street segments for the combination of an upstream speed code of 9 (50-100 Mbps) with a transtech code of 40 (DOCSIS 3.1). The provider confirmed that the speed was verified with their engineers. A search of their Web site, http://www.comcast.com/ned-305, shows the downstream speed of 305 Mbps. The provider said that we have to contact customer service reps to get the upstream speed. We called them and were told that the upstream speed is 65 Mbps in our area.

Section 5: Clarification Questions and Responses

```
From: Cliff Behrens [mailto:cbehrens@appcomsci.com]
Sent: Tuesday, March 19, 2013 3:52 PM
To: Duffy, Diane
```

Cc: Yu, Min J; Fiuk, Marek J
Subject: Re: comcast

All,

I just heard back from Michael. If you go to http://www.comcast.com/ned-305, you will read the ad below. Note that this only advertizes download speed. He said that to get upload speed, you have to contact one of their customer service reps. But he did verify the submitted upload speed with his engineers. So...the final answer is...he wants us to submit the upload speeds as they gave them to us. As a reality check, I called their service rep to ask what the upload and download speeds were for my residence in Madison. I was told that it is 65 Mbps up and 305 Mpbs down.

Cliff

Speed wins.
XFINITY® delivers the fastest Internet, now with download speeds up to 305 Mbps.

Introducing Extreme 305 from XFINITY – the fastest Internet available.
With Extreme 305 you get the speed you need for your entire house.
Stream full movies in HD, game in real time with no lag and download large multi-media files – on all of your devices, all at the same time.

Not only do you get the fastest Internet, but you'll get Constant Guard™, the most comprehensive online protection of any Internet provider, included at no extra cost – a $360 value. Constant Guard includes Norton™ Security Suite, identity theft protection and more to help keep you safe online.

Get the fastest Internet in your house for $299.95 a month.

Call 1-800-XFINITY to sign up today.

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Wednesday, February 22, 2012 6:51 AM
To: 'Ruger, Michael'
Subject: NJBB Clarification

Michael,
We wanted to verify that our processing strategy is still appropriate. During the previous rounds, we had difficulties in mapping the street-level data you provided for the large census blocks. The data is generally the same, so we anticipate similar issues. The approach we have taken was to assume Comcast offered full coverage for a set of municipalities (the list you provided is attached.) You also named three municipalities where that approach would not be advisable (Mount Olive Twp, Toms River, Berkeley Twp.). Can we use that same approach during this submission? Can you provide an updated list of municipalities or confirm that the attached list still applies?

John Wullert
Manager - NJ BB Data Collection
Applied Communication Sciences
732-699-2687

From: Ruger, Michael [mailto:Michael_Ruger@comcast.com]
Sent: Wednesday, February 22, 2012 6:53 AM
To: 'connectingnj@groups.appcomsci.com'
Subject: Re: NJBB Clarification

John--
We have not changed our communities served so the same list and logic apply. Would it help if we provided address data?
Thanks--
Michael

From: Wullert, John R II
Sent: Wednesday, February 22, 2012 6:58 AM
To: 'Ruger, Michael'; 'connectingnj@groups.appcomsci.com'
Subject: RE: NJBB Clarification

Michael,
The process we defined works well for the communities you serve completely. However, if it is still the case that you do not cover Mount Olive Twp, Toms River, Berkeley Twp completely, then address level data might be helpful there.

John

From: Ruger, Michael [mailto:Michael_Ruger@comcast.com]
Sent: Wednesday, February 22, 2012 9:15 AM
To: Wullert, John R II
Subject: RE: NJBB Clarification

John—

Let me know if this helps.

Thanks--
Michael

Michael Ruger
Senior Director, Government Affairs
Comcast Cable Communications, LLC
One Comcast Center
Philadelphia, Pennsylvania 19103
(215) 286-7586

Note: attachment was a list of 5284 addresses, all in large census blocks, including Technology of Transmission.

From: Ruger, Michael [mailto:Michael_Ruger@comcast.com]

Sent: Wednesday, February 22, 2012 1:25 PM
To: NJ Broadband Data Collection
Subject: RE: NJBB Clarification

John—

I took another look at what I sent…it's not sufficiently comprehensive to help you.

Thanks--
Michael

Michael Ruger
Senior Director, Government Affairs
Comcast Cable Communications, LLC
One Comcast Center
Philadelphia, Pennsylvania 19103
(215) 286-7586

Michael Ruger
Senior Director, Government Affairs
Comcast Cable Communications, LLC
One Comcast Center
Philadelphia, Pennsylvania 19103
(215) 286-7586

Mr. Behrens--

I believe this issue is one that we have encountered in other states, and results from the method by which we submit data. We provide maximum advertised speed data by MSA, but not all Census blocks within an MSA may offer D3 service--in which case, a D2 Census block may reflect a maximum advertised speed coded as "10." Similarly, but less frequently, Comcast may be in the process of upgrading service to D3 but has not yet initiated advertising for D3 speeds in that area--in which case, a D3 Census block may reflect a maximum advertised speed coded as "7."

Accordingly, if a D2 Census block is in a MSA in which the overwhelming majority of Census blocks are coded as a "10," those D2 blocks should be coded as a "7." If a D3 Census block is in an MSA coded as a "7," that is likely due to the fact that Comcast has not begun advertising the D3 speeds in that MSA.

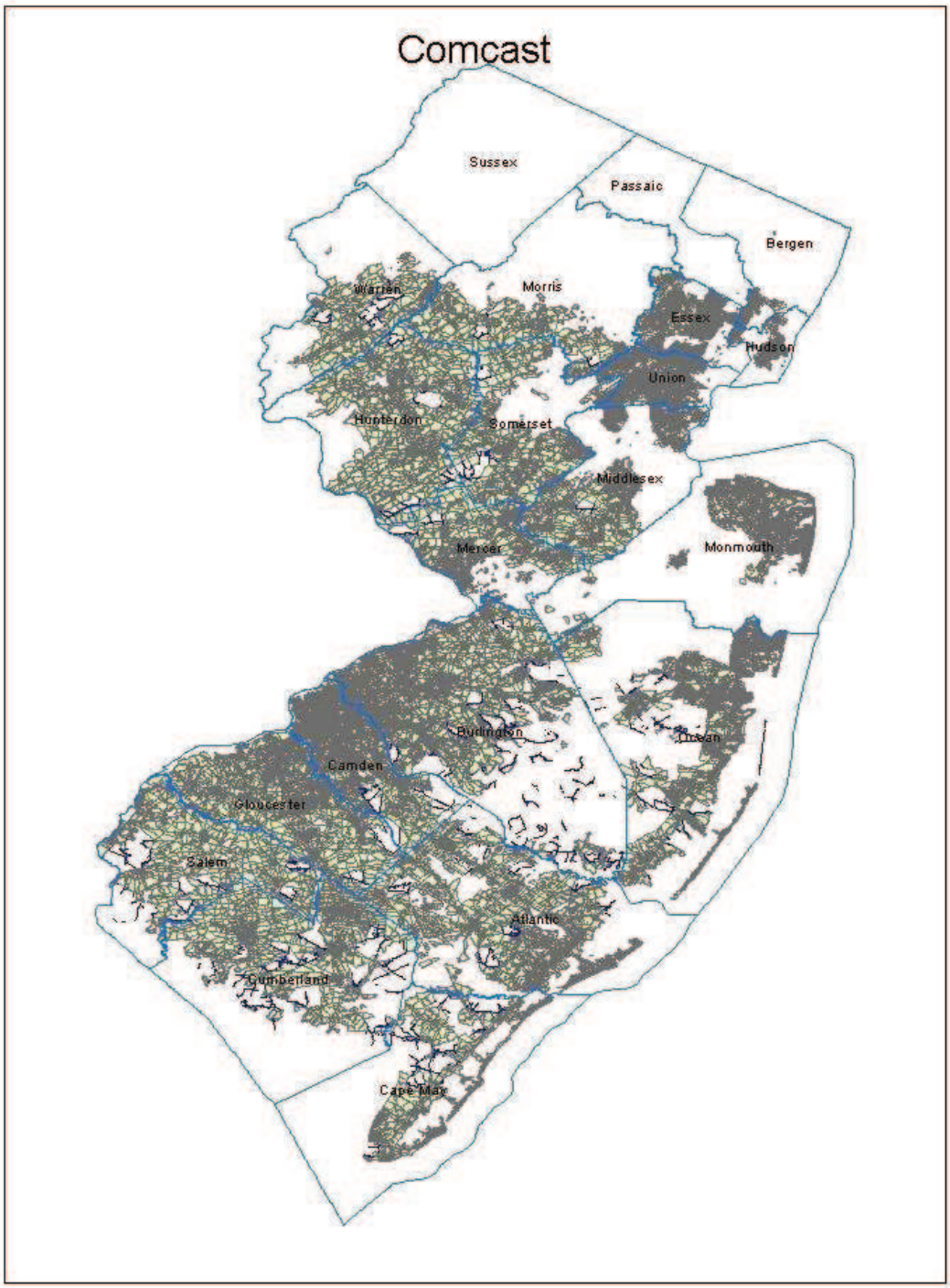
I believe in our last submission, Comcast showed 100% D3 blocks throughout the state of New Jersey and a maximum advertised download speed of "10." I am waiting for this cycle's data to confirm that this remains the case.

Please let me know if this helps, or if you would like to discuss.

Thanks--
Michael

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



Broadband Provider Data Report

Provider: GOES Telecom
Received: February 2013
Submission date: April 2013

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

None

Section 2: Submission Overview

<table>
<tr><th colspan="4">AVAILABILITY DATA</th></tr>
<tr><td>ID</td><td colspan="2">Provider name
“Doing business as” name
FRN
Holding company name
Holding company number</td><td>GOES Telecom
Not provided
0011437746
GOES
130548</td></tr>
<tr><th colspan="4">FOR WIRELINE</th></tr>
<tr><td>Filetypes</td><td colspan="3">1 Excel</td></tr>
<tr><td>File size</td><td colspan="3">worksheet 22 data rows</td></tr>
<tr><td>Speeds</td><td colspan="2"><table>
<tr><th>Type</th><th></th><th>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)</th></tr>
<tr><td>Typical-upstream</td><td></td><td>Not provided</td></tr>
<tr><td>Typical-downstream</td><td></td><td>Not provided</td></tr>
<tr><td>Advertised-upstream</td><td></td><td>Not provided</td></tr>
<tr><td>Advertised-downstream</td><td></td><td>Not provided</td></tr>
<tr><td>Subscriber-weighted-up</td><td></td><td>Not provided</td></tr>
<tr><td>Subscriber-weighted-down</td><td></td><td>Not provided</td></tr>
</table></td><td>Submitted 22 addresses with upload and download speeds (generally in kbps) for each address. These are delivered speeds to customers. We located advertised speeds on their Web site, and provider confirmed that those speeds were available at each location they served. We will use the data from Web site as advertised speeds.
Note that for two addresses, submitted speeds “10mpbh”. They confirmed this should be 10Mbps.
Note also that some speeds are listed as having faster upload speeds than download speeds. All of these values are less than broadband speeds, so are not relevant.
No typical or subscriber</td></tr>
</table>

		weighted speeds were provided.
Technology Type	10 (ADSL) and 70 (Terrestrial fixed wireless)	
End-user specification	None	
Comments: Provided a list of 22 customers and the speeds they are subscribed to. Most are 128K up, 512K down.		
INTERCONNECTION DATA		
ID	None provided	
File size		
Ownership		
Transport Type		
Data Rates/Capacity		
Location		
Comments:		

Section 3: Submission File Details

Received 1 file by email:

Size	Name
33,792	20130131 Telcordia.xls

The file contains a list of addresses and max speeds; e.g., the “up-to” limit of their rate plan. The addresses in this file appear to be for individual customers (as opposed to addresses of multi-tenant buildings in a central business district).

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_Service_CensusBlock

Loaded from supplied file “20130131 Telcordia.xls” (22 data rows). The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	Set to “Global Online Electronic Services, Inc.”

DBANAME	Not supplied; set same as PROVNAME
PROVIDER_TYPE	Set to 1
FRN	Set to “0011437746”
STATEFIPS	Set to “34” (NJ)
COUNTYFIPS	Populated from Census Block FIPS Code (digits 2-5)
TRACT	Populated from Census Block FIPS Code (next 6 digits)
BLOCKID	Populated from Census Block FIPS Code
BLOCKSUBGROUP	Set to null
FULLFIPSID	Populated from Census Block FIPS Code
TRANSTECH	As supplied in column Technology Code
MAXADDOWN	Set to code 4 per March 2011 email response to questions
MAXADUP	Set to code 3 per March 2011 email response to questions
TYPICDOWN	Set to null, not provided
TYPICUP	Set to null, not provided
SHAPE	Copied from Census Bureau 2010, as matched by spatial join on geocoded address point

Internal processing notes:

7. Geocoded the addresses using the Google geocoder to obtain latitude, longitude value pairs. Of 22 original records, all were successfully geocoded.
8. Created point shapes using ESRI from lat, long value pairs.
9. Spatially joined the points with Census Bureau Year 2010 reference data to find the containing census block. This yielded census-block attributes including the block ID (“geoid10”).
10. Verified that all 22 records joined successfully with NJ census blocks
11. Dropped 15 records that did not have broadband speeds
12. Dropped 1 records because of duplicate census blocks (caused by multiple customer addresses in the same census block).
13. All remaining records were verified to be in small (< 2 square miles) census blocks.
14. Loaded the resulting data into an SDE feature class.

NTIA Table BB_Service_Wireless

Loaded using shapes from reference data for the records that indicates wireless technology. The following table explains the transformations that were applied.

Table Column	**Data Source / Transformation**
PROVNAME	Set to “Global Online Electronic Services, Inc.”
DBANAME	Not supplied; set same as PROVNAME
FRN	Set to "0011437746"
TRANSTECH	Set to 70 as supplied in XLS sheet
SPECTRUM	Set to 6
MAXADDOWN	Set to 7

MAXADUP	Set to 7
TYPICDOWN	Set to null
TYPICUP	Set to null
STATEABBR	Set to “NJ”
SHAPE	Year 2010 Census Block shape obtained from reference data.

Internal processing notes:

21. Processed, as described above (points 1 – 7).
22. Spectrum: Set to 6, Unlicensed
23. Speeds: The fixed-wireless link is reported with 10Mbph, which we confirmed with provider is actually 10Mbps in each direction (symmetric). That corresponds to NOFA speed code 7. Provider also noted that they only have one fixed-wireless site.

Validation rules produced a warning on the wireless shape record for the combination of upstream and downstream speed codes of 7 (10-25 Mbps) with a transtech code of 70 (Fixed Wireless - Unlicensed). The provider has only a single fixed wireless site, and it is used for point-to-point links, rather than to provide a coverage area. The provider confirmed that the speed is 10 Mbps.

Section 5: Clarification Questions and Responses

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Friday, March 02, 2012 7:15 AM
To: 'georgeb@tricaps.com'
Subject: RE: Goes Telecom Telicordia data

George,
I wanted to confirm the speed values you included in the data you submitted. I have three questions:

1. In the past, we had used the data from your Web site to determine your maximum advertised upload and download speeds. I still see 1536K Downstream/768K Upstream as the fastest DSL speed you deliver. Is that correct?
2. You report two fixed wireless sites as “10mpbh”. Is that really mega-bits-per-hour? That comes to about 2.8 Mbps. Is that correct?
3. When we have spoken in the past, you reported that you use fixed wireless for point-to-point links, rather than to cover a wider area. Is that still correct?

Thanks for your participation,

John Wullert
Manager - NJ BB Data Collection
Applied Communication Sciences

From: georgeb@tricaps.com [mailto:georgeb@tricaps.com]

Sent: Monday, March 05, 2012 11:08 AM
To: NJ Broadband Data Collection
Subject: Re: Goes Telecom Telicordia data

Hi John,
I got the answers. See blow.
Thanks,
George

George,
I wanted to confirm the speed values you included in the data you submitted. I have three questions:

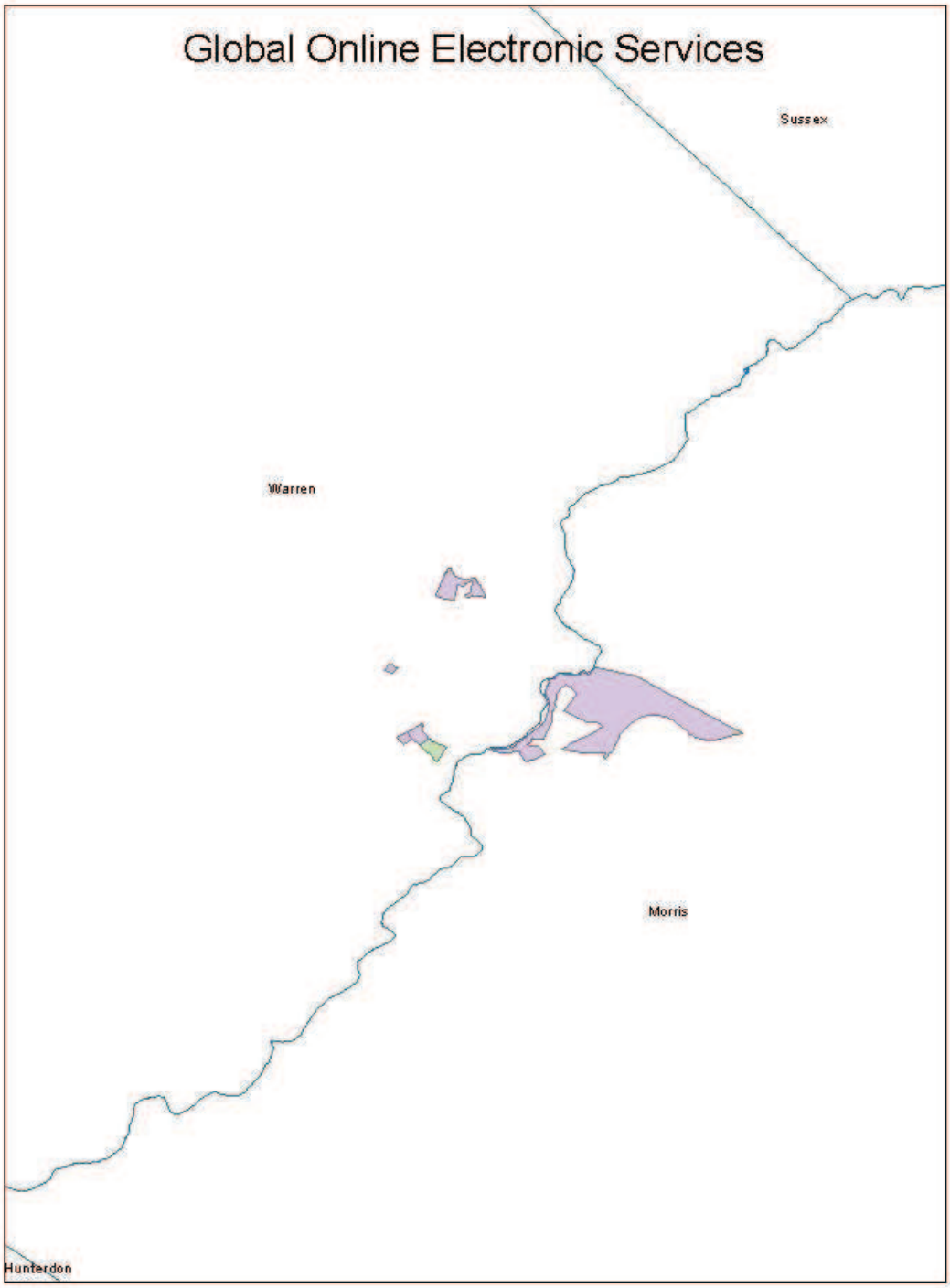
1. In the past, we had used the data from your Web site to determine your maximum advertised upload and download speeds. I still see 1536K Downstream/768K Upstream as the fastest DSL speed you deliver. Is that correct?
   Yes

2. You report two fixed wireless sites as "10mpbh". Is that really mega-bits-per-hour? That comes to about 2.8 Mbps. Is that correct?
   No, the correct speeds are 10mbps and we now only have a single fixed wireless link instead of two.

3. When we have spoken in the past, your reported that you use fixed wireless for point-to-point links, rather than to cover a wider area. Is that still correct?
   Yes

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



Connecting New Jersey - Broadband Provider Data Report

Provider: Hometown Online
Received: February 2013
Submission date: April 2013

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

No NDA in place.

Section 2: Submission Overview

<table>
<tr><th colspan="5">AVAILABILITY DATA</th></tr>
<tr><td>ID</td><td colspan="2">Provider name
“Doing business as” name
FRN</td><td colspan="2">Hometown Online Inc.
Warwick Online
0006-6512-44</td></tr>
<tr><th colspan="5">FOR WIRELINE</th></tr>
<tr><td>Filetypes</td><td colspan="4">Text</td></tr>
<tr><td>File size</td><td colspan="4">1,062,217 bytes; 7,054 rows</td></tr>
<tr><td>Speeds</td><td colspan="4"><table>
<tr><th>Type</th><th></th><th>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)</th></tr>
<tr><td>Typical-upstream</td><td></td><td>Not provided</td></tr>
<tr><td>Typical-downstream</td><td></td><td>Not provided</td></tr>
<tr><td>Advertised-upstream</td><td></td><td>Not provided</td></tr>
<tr><td>Advertised-downstream</td><td></td><td>Not provided</td></tr>
<tr><td>Subscriber-weighted-up</td><td></td><td>Not provided</td></tr>
<tr><td>Subscriber-weighted-down</td><td></td><td>Not provided</td></tr>
</table></td><td>Provided list of customer locations with column “DSL speed avail”. This is probably downstream speed, but need to verify with provider.

Communications with provider and validation via their Web site resulted in clarification: Max advertised ADSL speeds are:
Downstream: 15 Mbps
Upstream: 800 Mbps.</td></tr>
<tr><td>Technology Type</td><td colspan="4">DSL – Previous interactions with provider revealed that Census tract 3714 has SDSL, all others are ADSL</td></tr>
<tr><td>End-user specification</td><td colspan="4">Not provided</td></tr>
<tr><td colspan="5">Comments: Address data with some indications of qualification for different data services.</td></tr>
<tr><th colspan="5">INTERCONNECTION DATA</th></tr>
<tr><td>ID</td><td colspan="4"></td></tr>
</table>

File size	
Ownership	
Transport Type	
Data Rates/Capacity	
Location	
Comments: No connection-point data provided	

Section 3: Submission File Details

Received one (1) file by EMAIL:

Size	**Name**
1,062,217	NJ Final 8-14-12.xlsx

The file contains 7054 rows of data. Each row has a street address. All rows have an indication of maximum possible DSL speed. Some indicate 5Mbps, some 15Mpbs and some 30Mbps. Also has information about TV qualification, which we will ignore.

Section 4: Data Validation, Transformation and Loading

This section details the validations and transformations we applied to the provider submitted data.

NTIA Table BB_Service_CensusBlock

Loaded from the supplied file after geocoding. The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	Set to “Hometown Online Inc.”
DBANAME	Set to “Warwick Online”
PROVIDER_TYPE	Set to 1
FRN	Set to “0006651244”
STATEFIPS	Set to “34” (NJ)
COUNTYFIPS	Populated from Census Block 2010 (digits 2-5)
TRACT	Populated from Census Block 2010 (next 6 digits)
BLOCKID	Populated from Census Block 2010 Code
BLOCKSUBGROUP	Set to null
FULLFIPSID	Populated from Census Block 2010 Code
TRANSTECH	Census blocks in census tracts starting with 3714 were set to

	code “20” (SDSL) All others set to code “10” (ADSL), (per provider email)
MAXADDOWN	Set to code “7” (range includes 15Mbps, per email)
MAXADUP	For ADSL: Set to code “3” (range includes 1Mbps, per email) For SDSL: Set to code “7” (range includes 15Mbps, per email)
TYPICDOWN	Set to null, not supplied
TYPICUP	Set to null, not supplied
SHAPE	Copied from Census Bureau TigerLine 2000, as matched by spatial join on geocoded address point

Internal processing notes:

15. The following steps were performed when the data was submitted and the results were re-used for this round
    a. 7050 addresses were successfully geocoded using Arroyo with the Yahoo geocoder. One record failed to spatially join on 2010 NJ Census Block shapes.
    b. Created an excel sheet and imported to a geodatabase table.
    c. Added point shapes corresponding to each Latitude, Longitude pair by creating a feature class from the table using ArcCatalog’s “Create Feature Class from XY Table” option.
    d. Added a column containing the ID of the containing year 2010 census block via a spatial join of the point shapes and the census block shapes from reference data.
16. Discarded 6585 rows with duplicate census blocks, leaving 464 unique census blocks.
17. Discarded 3 census blocks larger than 2 square miles.
18. Loaded 461 blocks.
19. Validation rules produced a warning on 405 census blocks that had a transtech of 10 (ADSL) and a download speed code of 7 (10-25 Mbps). We searched the provider’s Web site for speed information. We only found one reference to speed packages, and these values and the Web page seemed out of date. We sent a request for clarification to the provider. The provider acknowledged the validation requirements, indicated that the Web page found by our search was in error and confirmed the submitted speed values. The president of the company also indicated that they would be launching a new Web site with corrected speed information in the near future.

Section 5: Clarification Questions and Responses

From: Scott Sommerer [mailto:s.sommerer@wvtcg.com]
Sent: Wednesday, February 22, 2012 7:21 PM
To: NJ Broadband Data Collection
Cc: shelley.bates@oit.state.nj.us
Subject: RE: Reminder - NJ Broadband Data Collection

Dear Sir or Madam:

I have investigated with technicians and engineers. Our data is totally unchanged from last year's submission

Have A GREAT DAY

J. Scott Sommerer
845 986 2250

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Thursday, February 23, 2012 8:11 PM
To: 'Scott Sommerer'
Cc: NJ Broadband Data Collection
Subject: RE: Reminder - NJ Broadband Data Collection

Scott,
As I mentioned, we have additional validations to perform. NTIA is questioning reported DSL speeds over 10 Mbps. In our previous interactions, you had given us the following speeds:

ADSL: 15 Mbps and uploads of 800 kbps.
SDSL: 15 Mbps up and down (available in Census tract 3714)

I see on your Web site now the packages you offer are at 512, 1 Mbps and 2 Mbps. Should we be using 2 Mbps as the download speed? Does this apply for both ADSL and SDSL?

Thanks in advance for the clarification.

John Wullert
Manager - NJ BB Data Collection
Applied Communication Sciences
732-699-2687

From: Scott Sommerer [mailto:s.sommerer@wvtcg.com]
Sent: Tuesday, February 28, 2012 10:35 AM
To: NJ Broadband Data Collection
Cc: Ginny Quackenbush
Subject: RE: Reminder - NJ Broadband Data Collection

John

I appreciate your validation requirements.

No, do not use 2 Mbps. Our website is inaccurate. Please use the submission from last year. With the higher speeds.

J. Scott Sommerer

From: Ginny Quackenbush [mailto:g.quackenbush@wvtc.com]
Sent: Tuesday, February 28, 2012 11:51 AM
To: Scott Sommerer; NJ Broadband Data Collection
Cc: Jean Beattie
Subject: RE: Reminder - NJ Broadband Data Collection

Good Afternoon,

FYI, we will be launching a new website by or before the end of March.
Our new website will have the correct information.

Thank you very much.

Virginia Quackenbush
President, Warwick Valley Telephone Company
47 Main Street - PO Box 592
Warwick, NY 10990

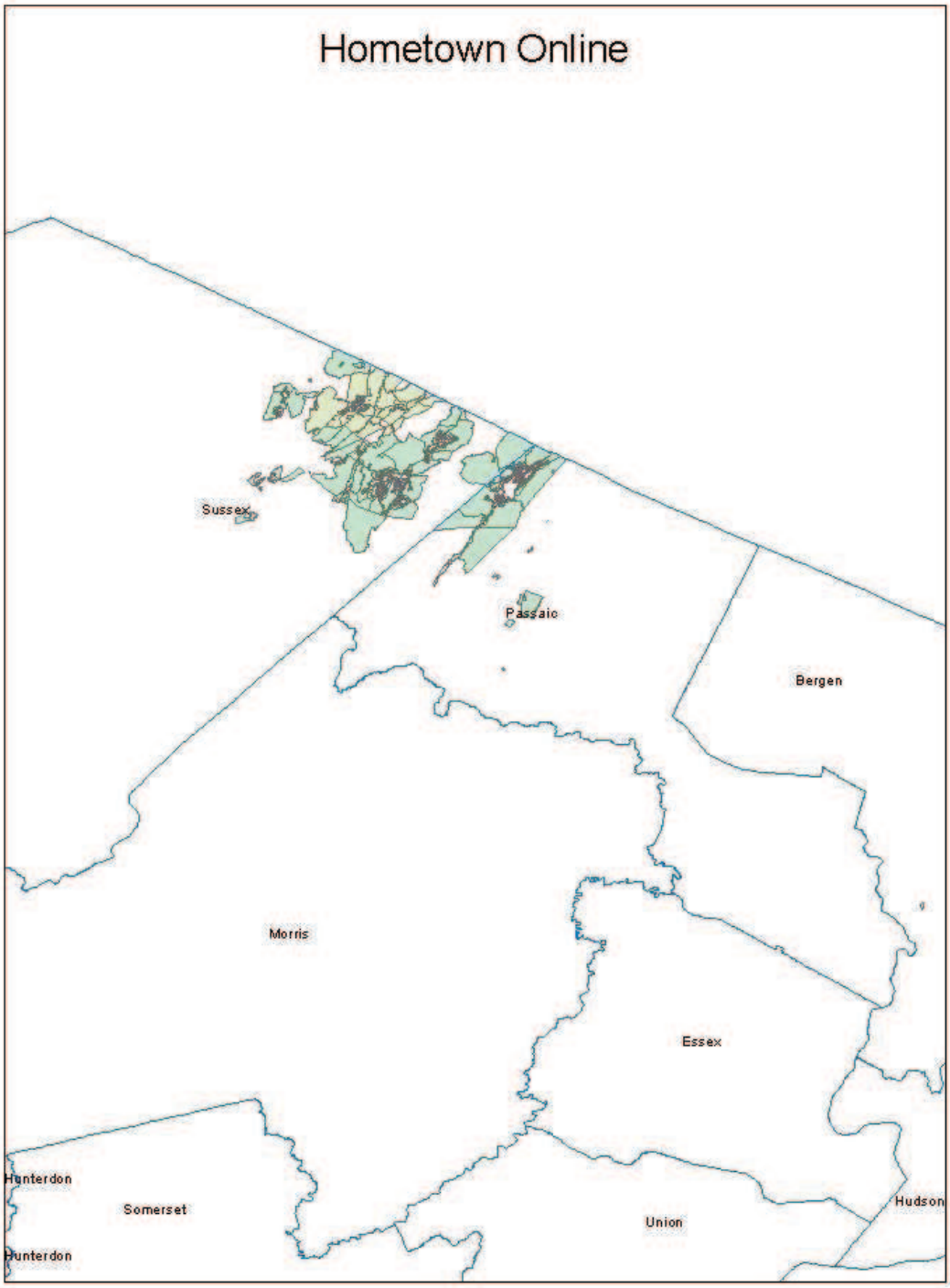
Section 6: Notes and Open Issues

Provider had provided the following information via email in prior rounds and confirmed again this round:

Maximum advertised download speed is 15 Mbps for both ADSL and SDSL
Maximum upload speed for ADSL is 800 Kbps

SDSL is available in census tract 3714xx, all other locations are ADSL

Section 7: Overview Map of Submitted Data



Connecting New Jersey - Broadband Provider Data Report

Provider: HughesNet Communications Inc.
Received: February 2013
Submission date: October 2013

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

NONE

Section 2: Submission Overview

<table>
<tr><th colspan="4">AVAILABILITY DATA</th></tr>
<tr><td>ID</td><td colspan="2">Provider name
“Doing business as” name
FRN</td><td>Hughes Network Systems, LLC
HughesNet
0017434911</td></tr>
<tr><th colspan="4">FOR WIRELINE</th></tr>
<tr><td>Filetypes</td><td colspan="3">CSV file with list of Year 2000 census blocks, plus email information on speed</td></tr>
<tr><td>File size</td><td colspan="3"></td></tr>
<tr><td>Speeds</td><td colspan="2"><table>
<tr><th>Type</th><th></th><th>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)</th></tr>
<tr><td>Typical-upstream</td><td></td><td>Not provided</td></tr>
<tr><td>Typical-downstream</td><td></td><td>Not provided</td></tr>
<tr><td>Advertised-upstream</td><td></td><td>Provided</td></tr>
<tr><td>Advertised-downstream</td><td></td><td>Provided</td></tr>
<tr><td>Subscriber-weighted-up</td><td></td><td>Not provided</td></tr>
<tr><td>Subscriber-weighted-down</td><td></td><td>Not provided</td></tr>
</table></td><td>Submitted CSV file with list of 141,363 records of Y2000 census blocks, specified by fips code, census tract and block. Note that this exceeds number of Y2000 census blocks in NJ.

Email message contained an description of speeds: 2Mbps down, 300Kbps up. The corresponding speed range codes are 4 down, 2 up.

Spectrum is 9, satellite.</td></tr>
<tr><td>Technology Type</td><td colspan="3">Code 60 (Satellite)</td></tr>
<tr><td>End-user specification</td><td colspan="3"></td></tr>
<tr><td colspan="4">Comments:</td></tr>
</table>

INTERCONNECTION DATA: NONE	
ID	
File size	
Ownership	
Transport Type	
Data Rates/Capacity	
Location	
Comments: Not provided	

Section 3: Submission File Details

With an exception of a change in reported speeds, information from previous rounds was reused.

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_Service_Wireless

The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	Set to "Hughes Network Systems, LLC"
DBANAME	Set to "HughesNet"
FRN	Set to 0017434911
TRANSTECH	Set to 60
SPECTRUM	Set to 7 per translation shown below
MAXADDOWN	Set to 7, see below.
MAXADUP	Set to 4", see below.
TYPICDOWN	Not provided, set to null
TYPICUP	Not provided, set to null
STATEABBR	Set to "NJ"
SHAPE	Single shape created from CBs (See below).

Internal notes on processing:

24. Spectrum: No statement was provided. The NTIA data model has a single column for spectrum. As per the latest clarifications, satellite corresponds to NTIA "SPECTRUM USED" code value 7.
25. We concatenated the fips code, census tract and block values into a census block ID. In some cases the census tract values had less than six digits. In

some cases the block id had less than four digits. In these cases, leading zeros were added to the values to pad the values to the correct length.

26. In 21 cases, the values for block ID and census tract were filled in with spaces. We attempted to pad these out with zeros, but the resulting census block IDs did not match any NJ census block. These 21 records represent the amount by which the submission exceeded the count of Y2000 NJ census blocks. These were dropped.
27. We verified that all of the resulting census block IDs were unique.
28. We compared the census block IDs generated from the submission with the set of 141,342 Y2000 census blocks for New Jersey. All NJ census blocks (large and small) were matched. .
29. Speeds: For maximum advertised speeds we encoded the down speed as value 7 (range 10-20 Mbps) and encoded the up speed as value 4 (range 1.5 Mbps – 3 Mbps).
30. We merged the census blocks into a single shape with the suffix "_dissol" using the ArcGIS "Dissolve" tool.
31. The resulting shape passed all NTIA validations

Section 5: Clarification Questions and Responses

From: Alok Mathur [mailto:Alok.Mathur@hughes.com]
Sent: Monday, March 12, 2012 1:17 PM
To: Wullert, John R II
Cc: Mark Wymer
Subject: RE: NJ Broadband Data Collection

John

You may download listing of each of the FIPS Code, Census Tract and Block where Hughes Network coverage is available at download speeds of up to 2 mbps and upload speeds of up to 300 kbps.
https://REDACTED
username: REDACTED
password: REDACTED

For the most recent data, please use the following folder;
/ Home/ ex_hns_pickup/ 201201 - Census 2000/

Thanks
Alok

Alok Mathur
PMP, CISA, CIPP, CRISC
Senior Director – Revenue Management
Hughes Network Systems, LLC., Germantown, MD 20876, USA.

On 9/6/2012 9:47 AM, Alok Mathur wrote:

Cliff

HughesNet broadband is available in the entire state. Detailed information about each of the FIPS Code, Census Tract and Block may be downloaded from the following URL location.

https://dlft02.datalabusa.com/

username: ex_hns_pickup

password: 2zpnH9!Q

Thanks

Alok

On 9/7/2012 2:17 PM, Alok Mathur wrote:

Please check folder /Home/ex_hns_pickup/201201. Folders were updated on 8/14/2012, as highlighted below. I have also attached the CSV version for your convenience. File contains 141,363 records. - Thanks

From: Connecting NJ [mailto:ConnectingNJ@appcomsci.com]
Sent: Friday, September 07, 2012 6:00 PM
To: Alok Mathur
Subject: Re: URGENT: Response Requested: Get your Broadband Services on the National Broadband Map

Alok,

Sorry for another note but the word I am getting back from the person who is loading all of the data we receive is that the attached CSV file is effectively identical to the zipped file (and to the file from your previous submission). Moreover, after downloading the files once again (from the exact location you indicated) and comparing the data with the previous submission, there are no differences. After unzipping, the date on the file is 1/27/2012 even though the zip file itself has the date 8/14/2012.

Please understand that, if necessary, we are willing to resubmit your data without updates; I just was operating on the impression that you wished to submit data more recent than the last April submission.
Please let me know what you want to do.

Regards,

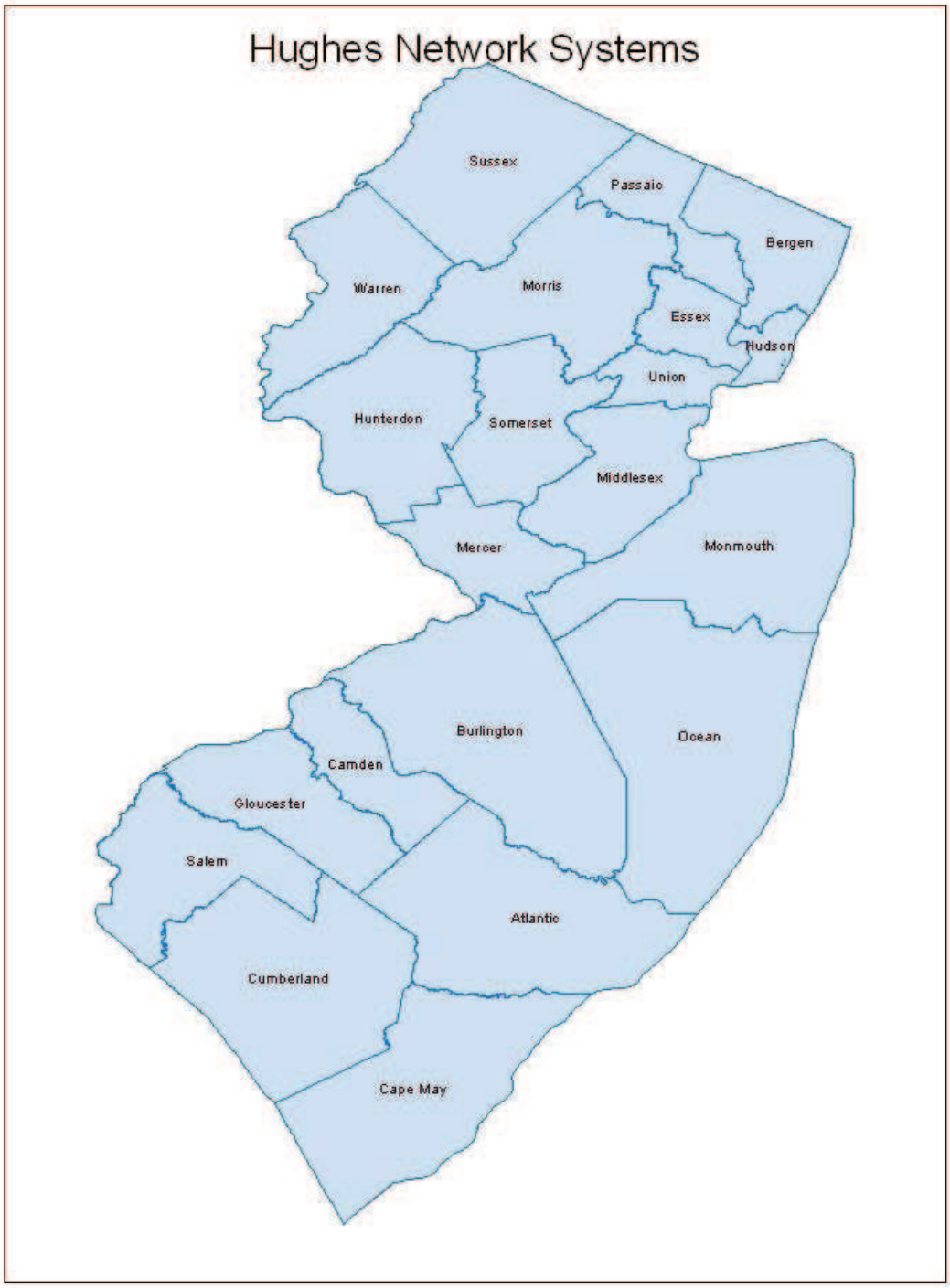
Cliff

Subject: RE: URGENT: Response Requested: Get your Broadband Services on the National Broadband Map
Date: Mon, 10 Sep 2012 08:39:08 -0400
From: Alok Mathur <Alok.Mathur@hughes.com>
To: Connecting NJ <ConnectingNJ@appcomsci.com>

Cliff
Your observation is correct. There is no change in the HughesNet coverage since last submission. HughesNet is available in the entire state of New Jersey. Files were updated on 8/14 to ensure that we have the most recent data.
Thanks
Alok

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



Broadband Provider Data Report

Provider: Jersey Shore Wireless
Received: March 2012
Submission date: April 2013

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

For April 2013:
This is a stub report, since data from the previous submission was reused unchanged. The complete report from the previous submission begins on the next page. Notable differences from the processing done on the previous submission are listed next.

Processing Steps:

3. Used ESRI: Data Management Tools->General->Append with NO_TEST schema type to copy jsw_oct2012.BB_Service_Wireless to jsw_apr2013.BB_Service_Wireless.

For October 2012:
This is a stub report, since data from the previous submission was reused unchanged. The complete report from the previous submission begins on the next page. Notable differences from the processing done on the previous submission are listed next.

Section 1: NDA Status

None

Section 2: Submission Overview

<table>
<tr><th colspan="4">AVAILABILITY DATA</th></tr>
<tr><td>ID</td><td colspan="2">Provider name
“Doing business as” name
FRN</td><td>Jersey Shore Wireless
Duxpond Communications
0011543782</td></tr>
<tr><th colspan="4">FOR WIRELESS</th></tr>
<tr><td>Filetypes</td><td colspan="2">shapefile collection: shp/dbf/prj/shx, mdb, gdb, imagefile etc.</td><td>Images files (jpegs) depicting coverage maps in various regions in New Jersey</td></tr>
<tr><td>Speeds</td><td>Type</td><td>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode)</td><td></td></tr>
<tr><td></td><td>Upstream max adv</td><td>10 Mbps listed on Web site</td><td></td></tr>
</table>

	Downstream max adv	Not specifically advertised. Listed as 800 kbps	
	Upstream typical	N/A	
	Downstream typical	N/A	
	Subscriber-weighted	N/A	
Technology Type	Spectrum (Mhz, FCC code)		Unlicensed
Comments:			
INTERCONNECTION DATA			
ID	NONE		
File size			
Ownership			
Transport Type			
Data Rates/Capacity			
Location			
Comments:			

Section 3: Submission File Details

Provider pointed us to information on their Web site, including coverage maps and speed offerings.

Section 4: Data Validation, Transformation and Loading

The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	Set to “Jersey Shore Wireless”
DBANAME	Set to “Duxpond Communications”
FRN	Set to 0011543782
TRANSTECH	Set to 70, for fixed wireless
SPECTRUM	Set to “6” for unlicensed
MAXADDOWN	Set to “6”, see below.
MAXADUP	Set to “3”, see below.

TYPICDOWN	Not provided, set to null
TYPICUP	Not provided, set to null
STATEABBR	Set to “NJ”
SHAPE	Generated, see below

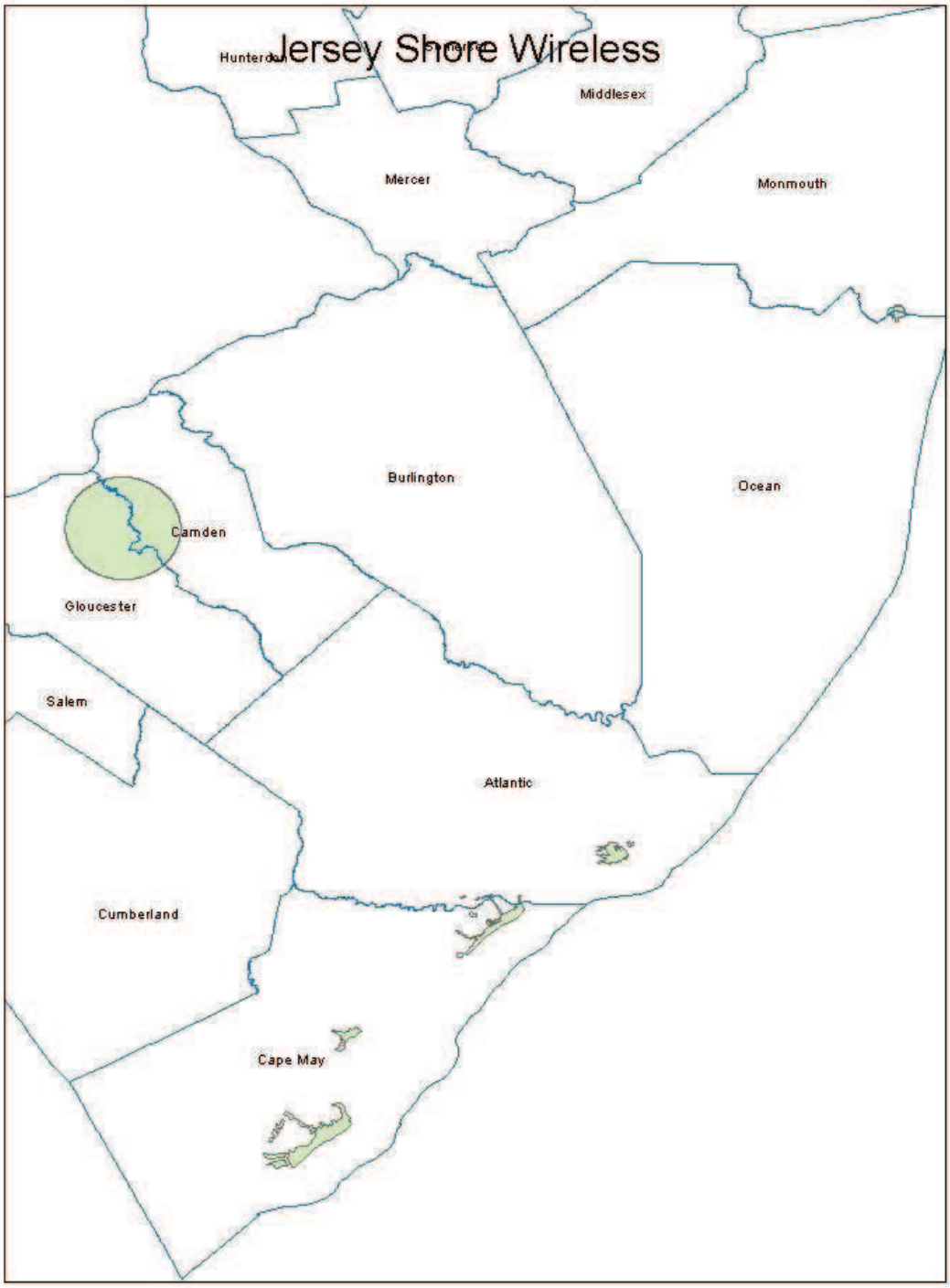
Internal notes on processing:

1. Provider directed us to their Web site, which included image files (jpeg) depicting coverage maps, along with listings of the speed plans they offer.
2. We manually created shape files that replicated the coverage in their image files to produce the SHAPE
3. Their Web site had two different listings for download speeds, one showing speeds of 1, 2 and 5 Mbps and the other showing speeds of 1, 2, 3 and 10 Mbps. Given the discrepancy between the two lists, and without any confirmation from the provider, we elected to map this to speed tier 6, ranging from 6 to 10 Mbps.
4. The Web site did not include advertised upload speeds. There was an indication of typical upload speeds of 800 Kbps. We mapped that value to a speed tier of 3.

Section 5: Clarification Questions and Responses

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



Broadband Provider Data Report

Provider: Leap Cricket
Received: March 2013
Submission date: April 2013

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

NDA with NJ OIT in place

Section 2: Submission Overview

<table>
<tr><td colspan="4">AVAILABILITY DATA</td></tr>
<tr><td>ID</td><td colspan="2">PROVIDER NAME
DBA NAME
FRN
Holding company name:
Holding company number:</td><td>Leap Wireless International, Inc.
Cricket Communications, Inc.
0002963528
Leap Wireless International, Inc."
130730</td></tr>
<tr><td colspan="4">FOR WIRELESS</td></tr>
<tr><td>Filetypes</td><td colspan="2">shapefile corresponding to NJ terrestrial mobile wireless coverage (type 80)</td><td></td></tr>
<tr><td>Speeds</td><td colspan="2"><table>
<tr><td>Type</td><td>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode)</td></tr>
<tr><td>Upstream max adv</td><td>yes (for entire shapefile) given in tier</td></tr>
<tr><td>Downstream max adv</td><td>yes (for entire shape) given in tier</td></tr>
<tr><td>Upstream typical</td><td>no.</td></tr>
<tr><td>Downstream typical</td><td>no.</td></tr>
<tr><td>Subscriber-weighted</td><td>no.</td></tr>
</table></td><td></td></tr>
<tr><td>Technology Type</td><td colspan="2">Spectrum : yes</td><td>3 (PCS) and 4(AWS)</td></tr>
<tr><td colspan="4">Comments:</td></tr>
<tr><td colspan="4">INTERCONNECTION DATA</td></tr>
<tr><td>ID</td><td colspan="3"></td></tr>
</table>

File size	
Ownership	
Transport Type	
Data Rates/Capacity	
Location	
Comments: no IC data provided.	

Quick loading results:

Figure 1. Loading results

Section 3: Submission File Details

1 zip file containing 6 files by (EMAIL, SECURE UPLOAD):

Name	Size
NJ_Broadband_Map_Region.zip	1,513 KB
Cricket Communications - Wireless Record Format.xlsx	12 KB
NJ_Broadband_Map_Region.DBF	2 KB
NJ_Broadband_Map_Region.prj	1 KB
NJ_Broadband_Map_Region.shp	2,360 KB
NJ_Broadband_Map_Region.SHX	1 KB
NJ_Broadband_Map_Region.TAB	2 KB

Section 4: Data Validation, Transformation and Loading

Loaded from the supplied file, with transformations as:

Table Column	Data Source / Transformation
PROVNAME	As supplied in column prov_name
DBANAME	As supplied in column dba_name
FRN	Set to " 0002963528"

TRANSTECH	As supplied in column tech_trans
SPECTRUM	Set to “4” per translation shown below
MAXADDOWN	As supplied in column down_speed.
MAXADUP	As supplied in column up_speed..
TYPICDOWN	Not supplied, set to null
TYPICUP	Not supplied, set to null.
STATEABBR	Set to “NJ”
SHAPE	As supplied.

Internal notes on processing:

5. The shape file contains 5 rows with a multipolygon shape (see above for preview picture). The columns identify that the technology of transmission is wireless and that two different spectrum ranges are in use.
6. The supplied shape uses geographic coordinate system GCS_WGS_1984, same as that required by the NTIA data model. No geographic transformation was required, but the XY Tolerance values differ if the shape file is imported trivially into the geo-database. Imported shape then mapped to separate shape with proper tolerance which resulted in a new feature class with the suffix “_tol”.
7. NTIA requires shapes to be contained in the NJ state boundary. Although we visually verified that it is the case, we clipped the shape using ESRI: Analysis Tools-> Extract -> Clip with, select feature class refdata_2010.tl_2010_34_state10_wgs. The feature class has the suffix "_clip"
8. Fixed values in order to coalesce shapes since NITA requires one shape per each unique of (spectrum, and maxaddown, and maxadup). The following table shows the current data:

prov_name	dba_name	pcs	aws	down_speed	up_speed
Leap Wireless International, Inc.	Cricket Communications, Inc.	Y	Y	3	2
Leap Wireless International, Inc.	Cricket Communications, Inc.	Y	Y	3	2
Leap Wireless International, Inc.	Cricket Communications, Inc.	N	Y	3	2
Leap Wireless International, Inc.	Leap Wireless International,	N	Y	6	4
Leap Wireless International, Inc.	Leap Wireless International,	N	Y	6	4

   The dba_names of the 4th and 5th record is inconsistent. Therefore they are changed to “Cricket Communications, Inc.”. As shown in the step 6, since the column, pcs, is not used and only the column, aws, is used, the values of pcs are changed to “Y”.
9. Coalesced the single-part polygons into one multi-part polygon using the ArcGIS ESRI: Data Management Tools->Generalization->Dissolve (with choosing everthing except objected, polyg_name, st_area, and st_length in the Dissolve_Field(s) option), which resulted in a new feature class with the suffix “_dissol” with 2 records.
10. Spectrum: Leap provided “Y” value in the columns spectrum_pcs and spectrum_aws. In response to previous queries on this, the provider had indicated that they covered separate areas, with PCS coverage limited to a few

counties, but did not provide separate shapes. We sent a request again. Therefore, we uniformly use value 4 (AWS) for the entire coverage, at this time.

Section 5: Clarification Questions and Responses

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Thursday, February 23, 2012 8:42 PM
To: 'Douglas White'
Cc: 'ConnectingNJ@research.telcordia.com'
Subject: RE: State broadband mapping, 5th round submission for Cricket

Doug,
We had asked previously, but wanted to see if there was any change. Are you able to generate separate shape files for the AWS and PCS coverage areas?

John Wullert
Manager - NJ BB Data Collection
Applied Communication Sciences
732-699-2687

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Tuesday, February 28, 2012 10:05 AM
To: Douglas White
Cc: ConnectingNJ@research.telcordia.com
Subject: NJ Broadband Clarification

Doug,
We have reviewed the data you submitted and have discovered two anomalies:

1. The FRN included in your shape file is 5927056. We have your FRN number as 0002963528. Is this latter number still correct?
2. The transtech number in your shape file is 160. This is an invalid value. We have your transtech as 80 (Terrestrial Mobile Wireless). Is this still correct?

Thanks for your help.

John Wullert
Manager - NJ BB Data Collection
Applied Communication Sciences
732-699-2687

From: Douglas White [mailto:dougwhite@cricketcommunications.com]
Sent: Friday, March 02, 2012 7:18 PM
To: NJ Broadband Data Collection
Cc: ConnectingNJ@research.telcordia.com
Subject: RE: NJ Broadband Clarification

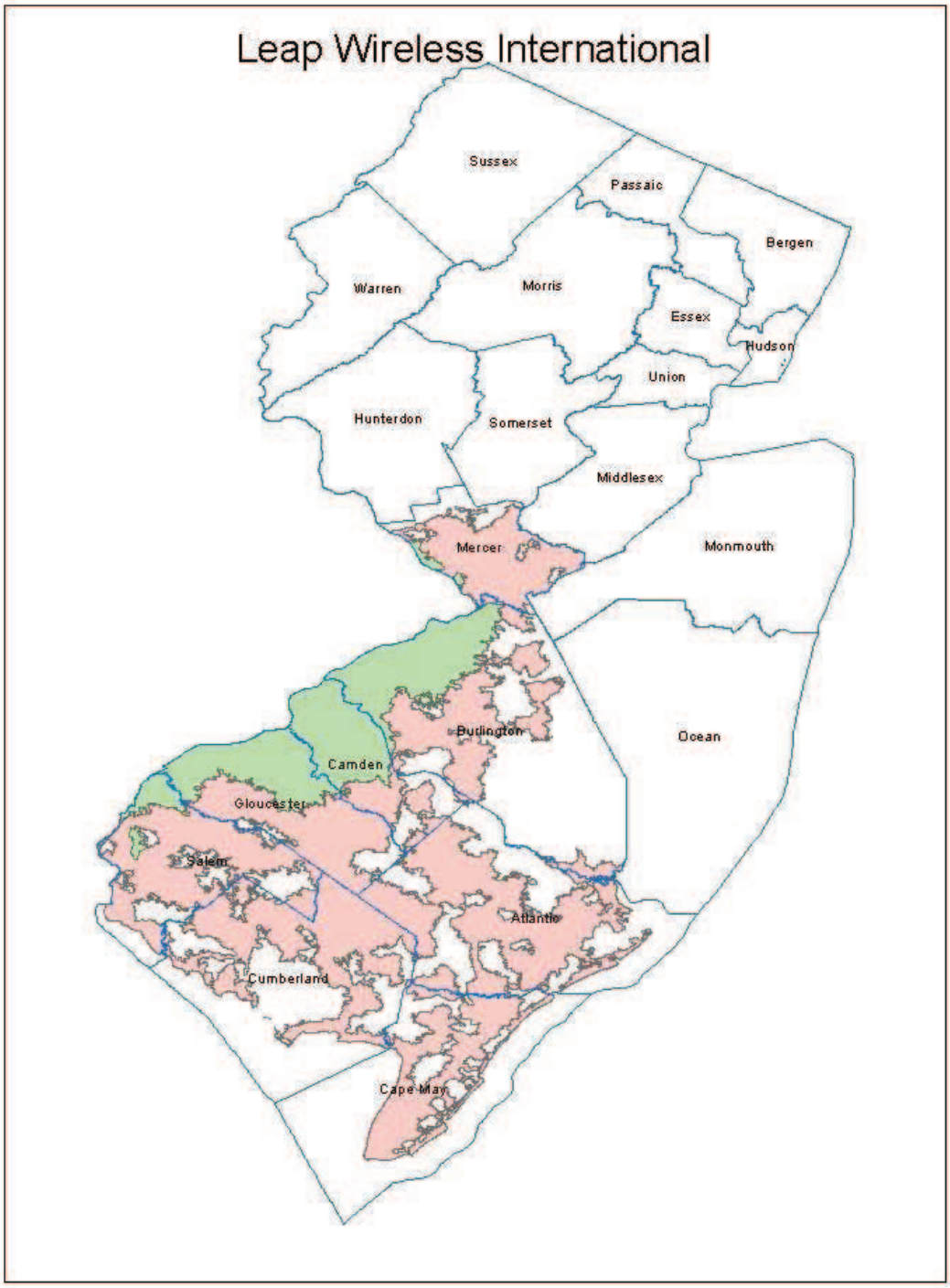
John –

I'm told that the NJ data we previously sent was incorrect. Please find attached the tables with the correction. The FRN is 2963528 and the technology is 80, are correct though.

Please contact me with any questions. Thanks,
-Doug

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



Connecting New Jersey - Broadband Provider Data Report

Provider: Level3 Networks, Inc.
Received: March 2013
Submission date: April 2013

This report presents details on processing of broadband data for delivery to the National Telecommunications and Information Administration.

Sections:

23. NDA Status
24. Submission Overview
25. Submission File Details
26. Data Validations and Results
27. Data Transformation and Loading
28. Clarification Questions and Provider Responses
29. Notes and Open Issues

Section 1: NDA Status

No NDA executed.

Section 2: Submission Overview

<table>
<tr><th colspan="4">AVAILABILITY DATA</th></tr>
<tr><td>ID</td><td colspan="2">Provider name
“Doing business as” name
FRN</td><td>Level 3 Communications, LLC
Level 3 Communications, LLC
0003723822</td></tr>
<tr><th colspan="4">FOR WIRELINE</th></tr>
<tr><td>Filetypes</td><td colspan="3">Text file spreadsheets</td></tr>
<tr><td>File size</td><td colspan="3">1061 data rows</td></tr>
<tr><td>Speeds</td><td colspan="2"><table><tr><th>Type</th><th></th><th>Address level data</th></tr><tr><td>Typical-upstream</td><td></td><td>Yes</td></tr><tr><td>Typical-downstream</td><td></td><td>Yes</td></tr><tr><td>Advertised-upstream</td><td></td><td>Yes</td></tr><tr><td>Advertised-downstream</td><td></td><td>Yes</td></tr><tr><td>Subscriber-weighted-nominal speed</td><td></td><td>Not provided</td></tr></table></td><td>All set to same value: 11 (>= 1gpbs)</td></tr>
<tr><td>Technology Type</td><td colspan="3">50 (optical carrier/fibre)</td></tr>
<tr><td>End-user</td><td colspan="3">Yes (addresses)</td></tr>
</table>

specification	
Comments: typical and Advertised UP and DOWN are ALL THE SAME VALUE: 11 (>= 1gpbs)	
INTERCONNECTION DATA	
ID	
File size	text spreadsheet with 93 rows. (See comment)
Ownership	Not provided
Transport Type	provided
Data Rates/Capacity	provided
Location	Address provided as well as lat/long
Comments: A number of rows were duplicates. In the past, provider has indicated that they are separate instances and should NOT be removed as duplicates.	

Section 3: Submission File Details

Received 2 files by secure upload:

Size kb	Name
134	AddressAvailability_New Jersey_3-4-2013.txt
12	MiddleMile_New Jersey_3-4-2013.txt

Section 4: Validations and Results

The “address” file has 1061 rows. All speed codes set the same, code 11 (1+ Gbps), suggesting these are all commercial customers.

The “middlemile” file has 93 rows, including some that are exact duplicates which we will have to discard despite the provider’s past assurances that they are “different”.

Section 5: Data Transformation and Loading

The standard NDA prohibits us from submitting address-level data to the NTIA. Instead, we discover the census block for each customer address, and then report the census block shape drawn from Census Bureau TigerLine reference data.

NTIA Table BB_ConnectionPoint_MiddleMile

Loaded from the supplied tab-separated file. The following table explains the

transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	As supplied in column “DBA” (no provider name supplied separately)
DBANAME	As supplied in column “DBA”
FRN	As supplied in column “FRN” after removing dashes
OWNERSHIP	Set to null (not supplied)
BHCAPACITY	As provided in column “Serving Facility Capacity”
BHTYPE	As provided in column “Serving Facility Type”
LATITUDE	As supplied
LONGITUDE	As supplied
ELEVFEET	As supplied (all zero values)
STATEABBR	Set to “NJ”
FULLFIPSID	ID of containing census block from Year 2010 Census Bureau TigerLine reference data
SHAPE	Point shape created using ESRI ArcDesktop

Internal notes on processing:

16. Imported the data to a geodatabase table
17. Added a point for each Latitude, Longitude pair by creating a feature class from the table using ArcCatalog’s “Create Feature Class from XY Table” option.
18. Added a column containing the ID of the containing year 2010 census block via a spatial join of the points and the census block shapes from reference data. All records successfully spatially joined on 2010 NJ Census Block shapes.
19. Discarded 20 records with identical lat, long values and addresses.
20. Loaded 73 records.

NTIA Table BB_Service_CensusBlock

Loaded from the supplied tab-separated file. The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	As supplied in column “DBA” (no provider name supplied separately)
DBANAME	As supplied in column “DBA”
PROVIDER_TYPE	Set to “1”
FRN	As supplied in column “FRN”
STATEFIPS	Set to “34” (NJ)
COUNTYFIPS	Populated from Census Block FIPS Code (first 3 digits)
TRACT	Populated from Census Block FIPS Code (next 6 digits)
BLOCKID	Populated from Census Block FIPS Code
FULLFIPSID	Populated from Census Block FIPS Code
TRANSTECH	As supplied in column “Technology of Transmission”

MAXADDOWN	As supplied in column “Maximum Advertised Download Speed”
MAXADUP	As supplied in column “Maximum Advertised Upload Speed”
TYPICDOWN	Set to null (see below)
TYPICUP	Set to null (see below)
ENDUSERCAT	Set to null (see below)
SHAPE	Copied from Census Bureau TigerLine 2010, as matched by spatial join on the geocoded address

Internal processing notes:

20. Geocoded the addresses using an Arroyo flow and the Yahoo geocoder, leaving the result with address and lat, long data in an Excel spreadsheet. Five records were rejected due to the very poor geocoding accuracy.
21. Imported the spreadsheet to an ESRI geodatabase table
22. Added point shapes corresponding to each Latitude,Longitude pair by creating a feature class from the table using ArcCatalog’s “Create Feature Class from XY Table” option
23. Added a column containing the ID of the containing year 2010 census block using ArcCatalog's spatial join feature. The newly created point shapes are joined against census block shapes from reference data.
24. Discarded typical speeds since they were in all cases identical to maximum advertised speeds, not measured values.
25. The end user category value as originally supplied applied to an address, but we must anonymize the addresses and report census blocks. The NTIA directs us to report the “predominant” end-user category, which is not supplied here.
26. Discarded 498 duplicate census block records, which result from multiple addresses in the same census block. Discarded 1 record located in the large census block.
27. Loaded 557 records.

Section 6: Clarification Questions and Responses

From: NJ Broadband Data Collection [mailto:ConnectingNJ@research.telcordia.com]
Sent: Wednesday, August 24, 2011 9:14 AM
To: Diamond, Greg
Cc: ConnectingNJ@research.telcordia.com
Subject: NJBB Data Clarification

Greg,
We have reviewed the data you submitted to the New Jersey Broadband Mapping program. We have one question. The middle-mile data you submitted in MiddleMile_New Jersey_8-18-2011.txt includes many rows that are duplicates. Can we safely discard these duplicate entries?

Thanks for you participation,

John Wullert
Manager – NJ BB Data Collection
Telcordia Technologies
732-699-2687

From: Diamond, Greg [mailto:Greg.Diamond@Level3.com]
Sent: Wednesday, August 24, 2011 1:17 PM
To: ConnectingNJ@research.telcordia.com
Subject: RE: NJBB Data Clarification

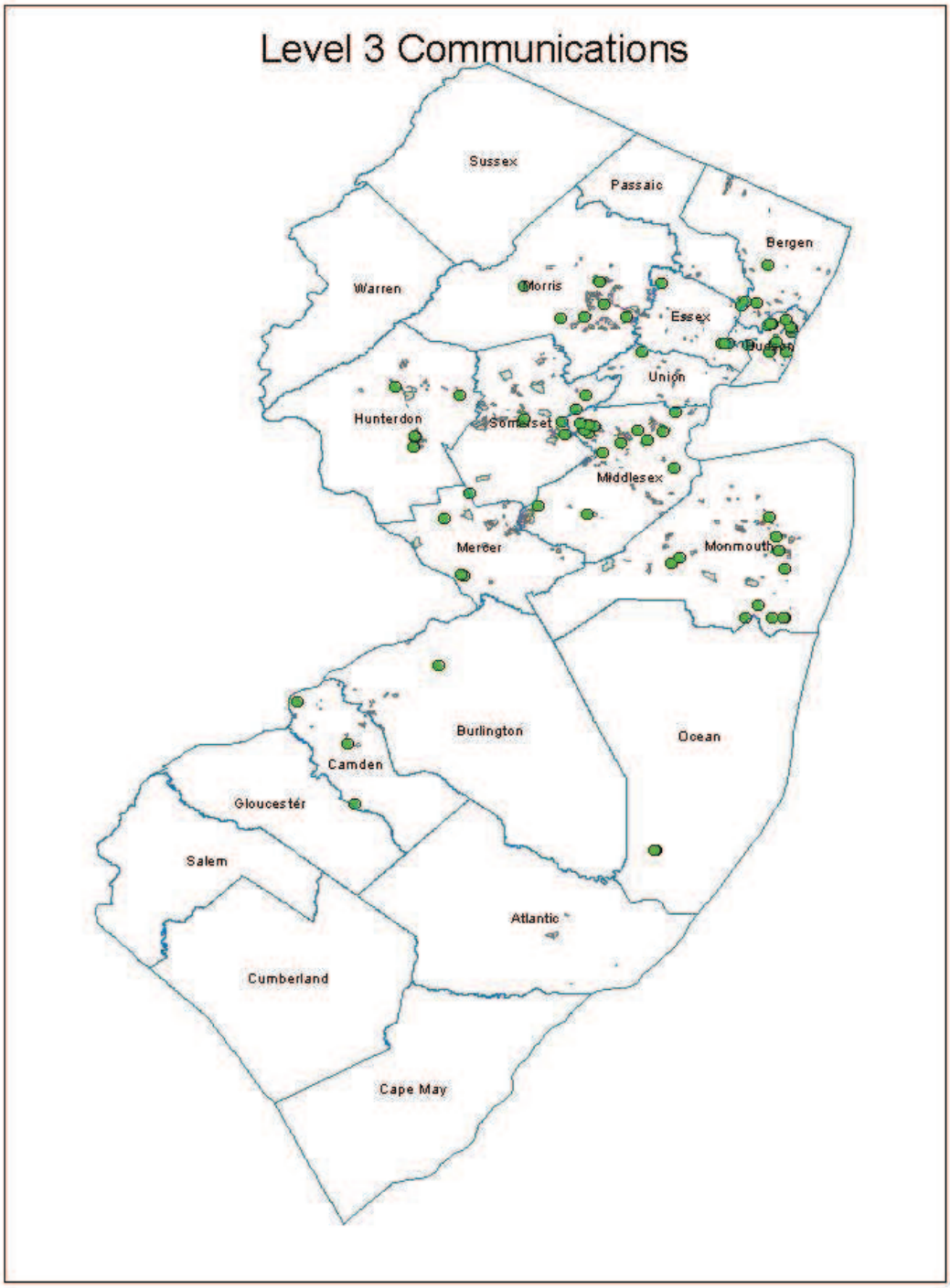
John, this issue came up with our CA submission as well. We investigated and determined that there were in fact some differences, albeit small, with some of the sites such that each site is in fact unique. Give that, I would not treat them as duplicates.

Greg

PLEASE NOTE MY NEW ADDRESS AND TELEPHONE NUMBER
Gregory T. Diamond
Regulatory Counsel
Level 3 Communications
1505 5th Avenue
Suite 501
Seattle, WA 98110
Desk: 206-652-5608
Mobile: 303-562-7378

Section 7: Notes and Open Issues

Section 8: Overview Map of Submitted Data



Connecting New Jersey - Broadband Provider Data Report

Provider: MegaPath Corporation (formerly Dieca DBA Covad)
Received: January 2013
Submission date: April 2013

This report presents details on processing broadband data for delivery to the National Telecommunications and Information Administration.

Sections:

30. NDA Status
31. Submission Overview
32. Submission File Details
33. Data Validations and Results
34. Data Transformation and Loading
35. Clarification Questions and Provider Responses
36. Notes and Open Issues
37. Overview Map of Submitted Data

Section 1: NDA Status

NDA was executed with NJ OIT.

Section 2: Submission Overview

<table>
<tr><td colspan="4">AVAILABILITY DATA</td></tr>
<tr><td>ID</td><td colspan="2">Provider name
“Doing business as” name
FRN</td><td>MegaPath Corporation
MegaPath Corporation
0003753787</td></tr>
<tr><td colspan="4">FOR WIRELINE</td></tr>
<tr><td>Filetypes</td><td colspan="3"></td></tr>
<tr><td>File size</td><td colspan="3"></td></tr>
<tr><td>Speeds</td><td colspan="3"><table>
<tr><th>Type</th><th></th><th>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)</th></tr>
<tr><td>Typical-upstream</td><td></td><td>Address & block</td></tr>
<tr><td>Typical-downstream</td><td></td><td>Address & block</td></tr>
<tr><td>Advertised-upstream</td><td></td><td>Address & block</td></tr>
<tr><td>Advertised-downstream</td><td></td><td>Address & block</td></tr>
<tr><td>Subscriber-weighted-up</td><td></td><td>county level</td></tr>
</table></td><td>Speeds are provided at address (line segment) and census block granularity.</td></tr>
</table>

	Subscriber-weighted-down		county level	
Technology Type	10 (ADS), 20 (SDSL), 30 (other copper)			
End-user specification	Not provided			
Comments:				
INTERCONNECTION DATA				
ID	File **MiddleMileConnection*.txt			
File size	1kb			
Ownership	1			
Transport Type				
Data Rates/Capacity	4, 5			
Location	5 locations			
Comments: Five (5) data rows provided				

Section 3: Submission File Details

Received a zip file by SECURE UPLOAD in January 2013:

Name	Size
MegaPathCorporation_NJ_CONFIDENTIAL.zip	629KB

The original archive contains the following five (5) files:

Name	Size
NJBB_0003753787_AddressSegmentAvailability_MegaPathCorporation_CONFIDENTIAL.txt	53 KB
NJBB_0003753787_CensusBlockAvailability_MegaPathCorporation_CONFIDENTIAL.txt	12,196 KB
NJBB_0003753787_CMAAdvertisedAvailability_MegaPathCorporation_CONFIDENTIAL.txt	2 KB
NJBB_0003753787_MiddleMileConnection_MegaPathCorporation_CONFIDENTIAL.txt	1 KB
NJBB_0003753787_SubscriberWeightedNominalSpeed_MegaPathCorporation_CONFIDENTIAL.txt	2 KB

Section 4: Data Validation and Results

Section 5: Data Transformation and Loading

The following describes the validations and transformations that were applied to the submitted data.

NTIA Table BB_ConnectionPoint_MiddleMile

Since the data is exactly the same as the last submission except the provider name, dba name and FRN and there is no change in NTIA data model, the table is copied from the 2012 October table, using an ESRI tool, "ArcToolBox->Data Management Tools->General->Append" with NO_TEST in the Schema Type option and the provider name, dba name and FRN are updated.

Below is description for the April 2012 model as a reference.

Loaded from supplied file "..MiddleMileConnection..". The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	As supplied in column Provider Name
DBANAME	As supplied in column DBA Name
FRN	As supplied in column FRN
OWNERSHIP	As supplied in column Ownership
BHCAPACITY	As supplied in column Serving Facility Capacity
BHTYPE	As supplied in column Service Facility Type
LATITUDE	As supplied in column Latitude
LONGITUDE	As supplied in column Longitude
ELEVFEET	As supplied in column Elevation
STATEABBR	Set to "NJ"
FULLFIPSID	ID of containing census block from Year 2010 Census Bureau reference data
SHAPE	Point shape created using ESRI

Internal notes on processing:

21. The data included the following fields:
    a. Provider Name
    b. DBA Name
    c. FRN
    d. Ownership
    e. Serving Facility Capacity
    f. Service Facility Type
    g. Latitude
    h. Longitude
    i. Street Address (blank)
    j. Elevation
22. There are 6 rows, different from the last submission. Viewing the data in ArcMap indicates that all points are in New Jersey.
23. Created an Excel sheet and imported to a geodatabase table.
    (The column data format of the FRN should be Text, not General. Save the excel in the 97-2003 format)
24. Added a point shape to each row corresponding to the Latitude, Longitude pair by creating a feature class from the table using ArcCatalog's "Create Feature

Class from XY Table" option. Specify WGS84 for the coordinate system of the points. Result is feature class middlemile_point_tol.

25. Added a column "geoid10" with the ID of the containing year 2010 census block via a spatial join of the points. Result is feature class middlemile_point_tol_cb.
26. Populated stateabbr and FRN column during data transformation and loaded table.

NTIA Table BB_Service_CensusBlock

Loaded from supplied file "..CensusBlockAvailability..". The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	As supplied in column Provider_Name
DBANAME	As supplied in column DBA_Name
PROVIDER_TYPE	Set to 1
FRN	As supplied in column FRN
STATEFIPS	Set to "34" (NJ)
COUNTYFIPS	Populated from Census_Block_ID (digits 3 to 5)
TRACT	Populated from Census_Block_ID (next 6 digits)
BLOCKID	Populated from Census_Block_ID (remaining 4 digits)
FULLFIPSID	As supplied in column Census_Block_ID
TRANSTECH	As supplied in column Technology_of_Transmission
MAXADDOWN	As supplied in column Maximum_Advertised_Downstream_Speed
MAXADUP	As supplied in column Maximum_Advertised_Upstream_Speed
TYPICDOWN	As supplied in column Typical Downstream Speed
TYPICUP	As supplied in column Typical Upstream Speed
ENDUSERCAT	Set to null because not supplied
SHAPE	As found in Census Bureau year 2010 reference data

Internal processing notes:

6. Following data fields were supplied:
    a. Provider Name
    b. DBA Name
    c. FRN
    d. Census Block ID
    e. Street NameStreet Segment ID (TLID)
    f. Technology of Transmission
    g. Maximum Advertised Downstream Speed
    h. Maximum Advertised Upstream Speed
    i. Typical Downstream Speed
    j. Typical Upstream Speed
7. The supplied text file has 204,714 rows.
8. Typical speeds were used as provided.
9. We used Census Bureau reference data for Year 2010 to locate and submit

geographic features (i.e., shapes) for each census block.

10. Total rows (shapes) loaded is 204713.
11. Validation rules produced a warning on 9,681 census blocks that had a transtech of 10 (ADSL) and a download speed code of 7 (10-25 Mbps). We reported this to the provider, who confirmed the submitted data. The provider offers ADSL2+, with a download speed of 15 Mbps, in select areas in New Jersey.

NTIA Table BB_Service_RoadSegment

Loaded from supplied File "..AddressSegmentAvailability..". The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	As supplied in column Provider_Name
DBANAME	As supplied in column DBA_Name
PROVIDER_TYPE	Set to 1
FRN	As supplied in column FRN
ADDMIN	Set to the least of the non-empty address numbers from TigerLine
ADDMAX	Set to the greatest of the non-empty address numbers from TigerLine
PREDIR	Set to null (no value supplied)
STREETNAME	As supplied (has all street components, not just name)
STREETTYPE	Set to null (no value supplied)
SUFFDIR	Set to null (no value supplied)
CITY	Set to null (no value supplied)
STATECODE	Set to "NJ"
ZIP5	Set to zipl from TigerLine
ZIP4	Set to null (no value available in reference data)
TRANSTECH	As supplied in column Technology_of_Transmission
MAXADDOWN	As supplied in column Maximum_Advertised_Downstream_Speed
MAXADUP	As supplied in column Maximum_Advertised_Upstream_Speed
TYPICDOWN	As supplied in column Typical Downstream Speed
TYPICUP	As supplied in column Typical Upstream Speed
SHAPE	Road segment shape from Year 2010 TigerLine reference data, as matched by TLID

Internal processing notes:

1. The following data fields were submitted
    a. Provider Name
    b. DBA Name
    c. FRN
    d. Census Block ID
    e. Technology of Transmission
    f. Maximum Advertised Downstream Speed
    g. Maximum Advertised Upstream Speed
    h. Typical Downstream Speed

i. Typical Upstream Speed

2. There were 647 input rows. One was row was removed as a duplicate, in terms of county and Tiger Line ID. After a join against Census Bureau 2010 reference data, no rows were discarded based on compound key of county, TLID, and tech_transmission fields. Total rows (shapes) loaded is 646.

Section 6: Clarification Questions and Responses

Subject: Re: Feedback regarding unserved census blocks in your service area
From: Connecting NJ <ConnectingNJ@appcomsci.com>
Date: 12/11/2012 4:23 PM
To:
Stefanie Santa-Esparza <Stefanie.Santa-Esparza@megapath.com>

Stefanie,

This is useful information. Thank you for getting back to us.

Regards,

Cliff

On 12/11/2012 10:40 AM, Stefanie Santa-Esparza wrote:
> Cliff,
> We have looked these over and they are situations near coverage borders where we have smaller blocks surrounded by large, odd-shaped blocks that have partial coverage. When the partial coverage is considered, these cases are not actually donuts. It's an artifact of the geometry and granularity of these blocks, and this is why the number of cases is relatively small (12 blocks compared to a coverage area of 94,419 blocks).
>
> Thus, I can confirm that what we submitted is our best representation of our coverage area.
>
> Thanks,
> Stefanie
>
> -----Original Message-----
> From: Connecting NJ [mailto:ConnectingNJ@appcomsci.com]
> Sent: Monday, December 10, 2012 10:26 AM
> To: Katherine Mudge
> Cc: Stefanie Santa-Esparza
> Subject: Feedback regarding unserved census blocks in your service area
>
> Ms. Mudge,
>
> As part of our process to continually improve the quality of broad band Service Provider data that we provide to the NTIA, we have been analyzing data from our Oct. 2012 submission. One analysis we conduct discovers what we call "donut holes" -- these are unserved (but
> populated) census blocks, which are surrounded by census blocks for which you have reported service.
>
> The results from our donut hole analysis of your recent data are attached to this note. These results include for each "donut hole"
> census block both the census block ID and the number of its residents.

> We are providing this feedback with the hope that it might be useful for improving the accuracy of your submitted service area. We wanted to do this well-enough in advance of the next submission round -- which will be due to us in the late January timeframe -- so as to give you an opportunity to revise your data for these census blocks, as you see fit.
>
> Thank you again for you continued participation in the NJ Broadband Mapping Program.
>
> Cliff Behrens
> Manager - NJ BB Data Collection
> Applied Communication Sciences
> ConnectingNJ@groups.appcomsci.com
> 908.748.2380

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Thursday, February 23, 2012 9:00 PM
To: 'Stefanie Santa-Esparza'
Cc: NJ Broadband Data Collection
Subject: NJ Broadband Clarification

Stefanie,
The NTIA has provided additional validation rules for us to apply to the data during this round. One of these rules raises and warning, and requires additional clarification, in cases where ADSL is reported with a speed code of 7 (10-25 Mbps). In the data you supplied, there are about 15,000 census blocks that meet this condition. Can you please confirm that these values are correct? A few of the census blocks with this combination are listed below.

Thanks for your help,

John Wullert
Manager - NJ BB Data Collection
Applied Communication Sciences
732-699-2687

340030010005000
340030010005001
340030010005002
340030010005003
340030010005004
340030010005005
340030010005006
340030010005008
340030010005010

From: Stefanie Santa-Esparza [mailto:Stefanie.Santa-Esparza@megapath.com]
Sent: Friday, February 24, 2012 12:21 PM
To: 'NJ Broadband Data Collection'
Subject: RE: NJ Broadband Clarification

John,

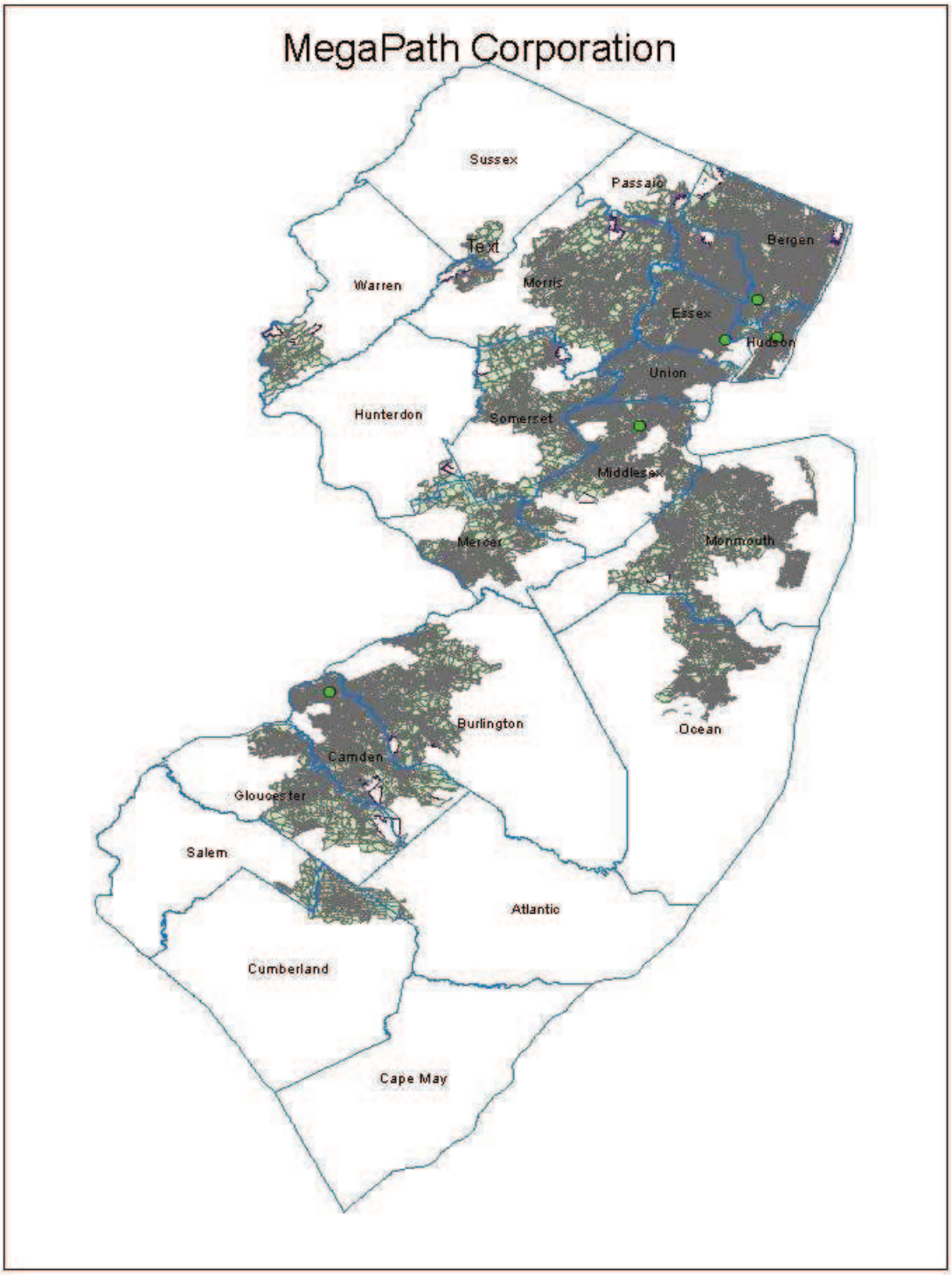
Our highest bandwidth asymmetric DSL is ADSL2+ for which we have a 15.0Mbps/1.0Mbps offering, in limited parts of the state. Actually, at the beginning of this month, we reduced our ADSL2+ deployment in NJ from 54 central offices down to 35 central offices, but the blocks specified in our Round 5 submission indeed represent our 2011 Year End coverage.

Thanks,
Stefanie

Section 7: Notes and Open Issues

The provider submitted the file "..CMAAdvertisedAvailability..", which provides three technology codes (10, 20, 30), MSA codes, and max advertised up and down speed codes. The max speed for a given technology is different for different MSAs. We did not use this data since max speed codes were provided on a row-by-row basis.

Section 8: Overview Map of Submitted Data



Connecting New Jersey - Broadband Provider Data Report

Provider: Monmouth Telephone and Telegraph
Received: January 2013
Submission date: April 2013

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

Signed NDA is in place with NJ OIT.

Section 2: Submission Overview

<table>
<tr><th colspan="4">AVAILABILITY DATA</th></tr>
<tr><td>ID</td><td colspan="2">Provider name
“Doing business as” name
FRN</td><td>Monmouth Telephone & Telegraph
same
0004325205</td></tr>
<tr><th colspan="4">FOR WIRELINE</th></tr>
<tr><td>Filetypes</td><td colspan="3">Csv (AddressLevelAvailability for period 12312012.csv)</td></tr>
<tr><td>File size</td><td colspan="3">90 Kbytes, 894 records</td></tr>
<tr><td>Speeds</td><td colspan="3">
<table>
<tr><th>Type</th><th></th><th>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)</th></tr>
<tr><td>Typical-upstream</td><td></td><td>Address</td></tr>
<tr><td>Typical-downstream</td><td></td><td>Address</td></tr>
<tr><td>Advertised-upstream</td><td></td><td>Address</td></tr>
<tr><td>Advertised-downstream</td><td></td><td>Address</td></tr>
<tr><td>Subscriber-weighted-up</td><td></td><td>None provided</td></tr>
<tr><td>Subscriber-weighted-down</td><td></td><td>Not provided</td></tr>
</table>
</td></tr>
<tr><td>Technology Type</td><td colspan="3">Code 30 – other copper line
Code 50 - Optical Carrier/Fiber to the End User</td></tr>
<tr><td>End-user specification</td><td colspan="3">Code 4 – Medium or Large Enterprise</td></tr>
<tr><td colspan="4">Comments:</td></tr>
</table>

INTERCONNECTION DATA	
ID	
File size	
Ownership	
Transport Type	
Data Rates/Capacity	
Location	
Comments: No middle mile was provided at this time. Monmouth gave the following explanation: Please note that Table 8, “Middle-mile and Backbone Interconnection Points Data”, is not included per instructions on page 11 of the Data Submission Specifications” “Middle-mile and Backbone Interconnection Point information should focus on the connectivity at a point. That is, if a point at which network elements or segments are joined would not reasonably offer the possibility of technical connectivity with the network[s], it should not be reported”.	

Section 3: Submission File Details

The data are very similar to the last submission.

Received 1 zip file:

Size	**Name**
20Kb	Broadband Mapping.zip

The zip archive contains the following files:

Size	**Name**
90Kb	AddressLevelAvailability for period 12312012.csv
1Kb	CMA Advertised Availability for period ending 12312012.csv
1Kb	SubscriberWeightedNomainalSpeed for 12312012.csv
22Kb	Read Me.doc

File details:

AddressLevelAvailability for period 12312012.csv:

The file contains 946 records. Note that data file does not have a header row, but follows (largely) the ADDRESS DATA table from the NTIA “State Broadband Data and Development Grant Program” document. The columns and the corresponding headers are:

A - Provider Name
C - FRN

D-L - Address
M - EndUserCat
N - TransTech
O - MaxAdvDown
P - MaxAdvUp
Q - TypicDown
R - TypicUp

The FRN is missing leading zeros. Most of the zip codes do not have the required leading zeros. It was established (prior interactions) that the DBA is Monmouth Telephone & Telegraph. Certain addresses will need to be fixed for geocoding (also per prior interactions).
Some records have speed tiers of 2 or less.

CMA Advertised Availability for period ending 12312012.csv

The file contains 16 records. Note that data file does not have a header row, but follows the CMA data submission template that we posted on the connectingnj web site. The columns and the corresponding headers are:

A - Provider Name
C - FRN
D - CMA
E - TransTech
F - MaxAdvDown
G - MaxAdvUp

SubscriberWeightedNomainalSpeed for 12312012.csv

The file contains 16 records. Note that data file does not have a header row, but follows the Subscriber-Weighted Nominal Speed data submission template that we posted on the connectingnj web site. The columns and the corresponding headers are:

A - Provider Name
C - FRN
D - CMA
E - TransTech
F - SubsWeightedSpeed

Read Me.doc

The file contains explanations of the submission.

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_Service_CensusBlock

We loaded from supplied Excel spreadsheet after suitable geo-spatial operations that obtained latitude/longitude pairs for each address. The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	Set to “Monmouth Telephone & Telegraph”
DBANAME	Set same as PROVNAME
PROVIDER_TYPE	Set to 1
FRN	Set to “0004325205”
STATEFIPS	Set to “34” (NJ)
COUNTYFIPS	Populated from Census Block FIPS Code (first 3 digits)
TRACT	Populated from Census Block FIPS Code (next 6 digits)
BLOCKID	Populated from Census Block FIPS Code
BLOCKSUBGROUP	Set to null
FULLFIPSID	Populated from Census Block FIPS Code
TRANSTECH	As supplied in column TransTech
MAXADDOWN	As supplied in column MaxAdvDown
MAXADUP	As supplied in column MaxAdvUp
TYPICDOWN	Set to null
TYPICUP	Set to null
SHAPE	Copied from Census Bureau TigerLine 2000, as matched by spatial join on geocoded address

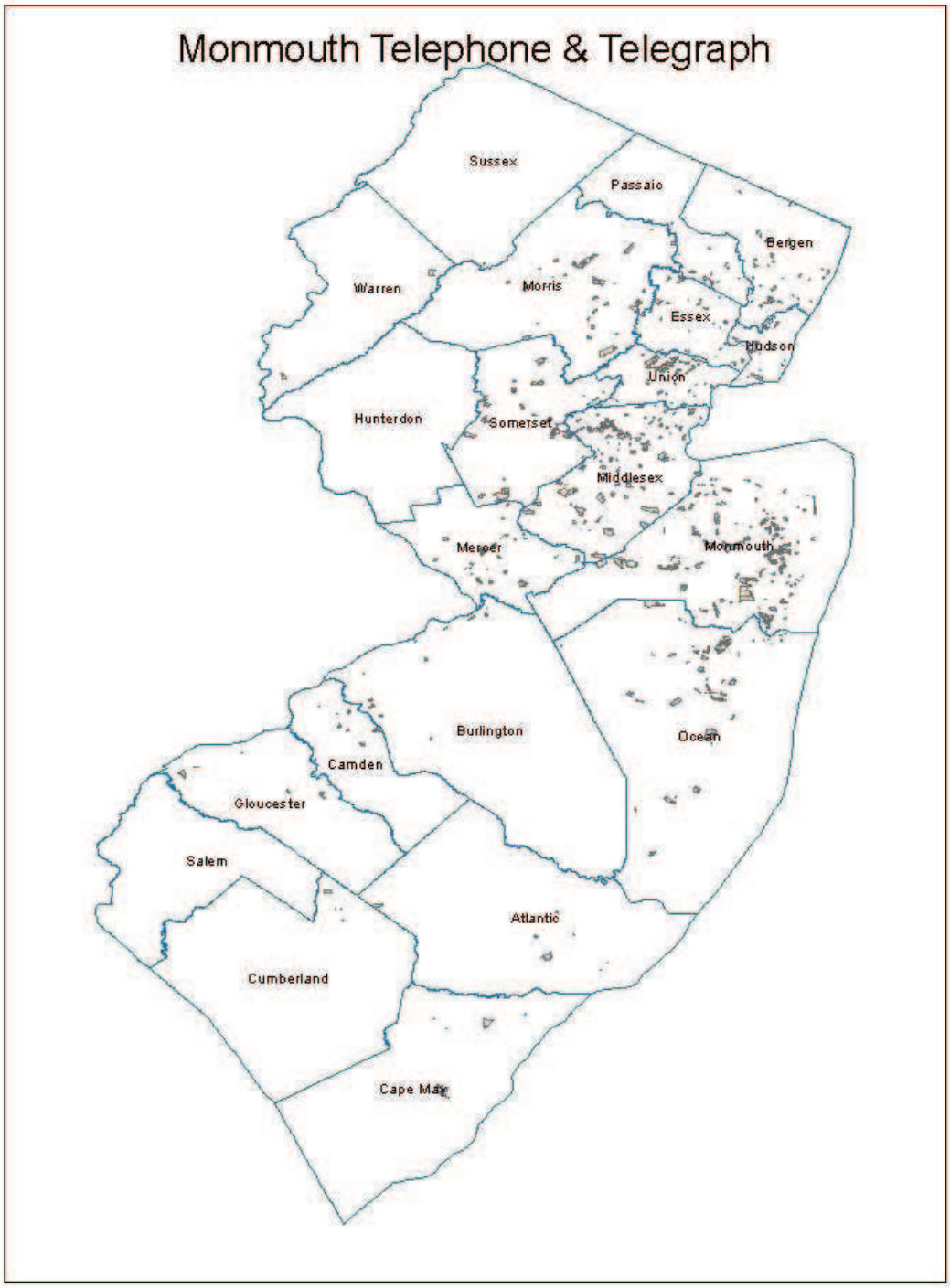
Internal processing notes:

28. All AddressLevelAvailability for period 12312012.csv records were successfully geo-coded using the Google and Yahoo geocoders to obtain a Latitude, Longitude pair for each. Created an Excel sheet and imported it to a geodatabase table.
29. Added point shapes corresponding to each Latitude, Longitude pair by creating a feature class from the table using ArcCatalog’s “Create Feature Class from XY Table” option.
30. Added a column containing the ID of the containing year 2010 census block via a spatial join of the point shapes and the census block shapes from reference data.
31. Discarded two record that failed to properly spatially join on the 2010 NJ Census Block shapes.
32. Discarded 62 rows because the max adv down speed code was 1 or 2, which is not broadband according to the requirements of the NOFA
33. Discarded 132 rows with duplicate census blocks while preserving the greatest speed. These result from multiple customers in the same census block.
34. Discarded 6 large census blocks (greater than 2 square miles).
35. Final record count loaded is 692.

Section 5: Clarification Questions and Responses

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



Connecting New Jersey - Broadband Provider Data Report

Provider: Network Billing Systems
Received: February 2012
Submission date: April 2013

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

For April 2013:
This is a stub report, since data from the previous submission was reused unchanged. The complete report from the previous submission begins on the next page. Notable differences from the processing done on the previous submission are listed next.

Processing Steps:

4. Used ESRI: Data Management Tools->General->Append with NO_TEST schema type to copy nbs_oct2012.BB_ConnectionPoint_MiddleMile to nbs_apr2013. BB_ConnectionPoint_MiddleMile.

For October 2012:
This is a stub report, since data from the previous submission was reused unchanged. The complete report from the previous submission begins on the next page. Notable differences from the processing done on the previous submission are listed next.

For April 2012:
This is a stub report, since data from the previous submission was reused unchanged. The complete report from the previous submission begins on the next page. Notable differences from the processing done on the previous submission are listed next.

For October 2011:

Section 1: NDA Status
None

Section 2: Submission Overview

AVAILABILITY DATA				
ID	Provider name “Doing business as” name FRN	Network Billing Systems LLC 0004965141		
FOR WIRELINE				
Filetypes				
File size				
Speeds	Type		Spatial Resolution:	

			address
	Typical-upstream		
	Typical-downstream		
	Advertised-upstream		
	Advertised-downstream		
	Subscriber-weighted-up		
	Subscriber-weighted-down		

Technology Type	Types:
End-user specification	
Comments:	
INTERCONNECTION DATA	
ID	
File size	
Ownership	Confirmed via email - Leased
Transport Type	Fiber
Data Rates/Capacity	T1 to OC 48 (2.488 Gbps)
Location	Provided by street address
One email with three addresses of their fiber ring interconnections, two in New Jersey.	

Section 3: Submission File Details

Received information via email:

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_ConnectionPoint_MiddleMile

The following table explains the transformations that were applied.

Table	Data Source / Transformation

Column	
PROVNAME	Set to “Network Billing Systems LLC”
DBANAME	Set to “Network Billing Systems LLC”
FRN	Set to “0004965141”
OWNERSHIP	Set to null, not provided
BHCAPACITY	Set to 5, OC-48 is 2.5Gbps
BHTYPE	Set to 1, transport facility is fiber
LATITUDE	As computed from address
LONGITUDE	As computed from address
ELEVFEET	Set to “0” (zero)
STATEABBR	Set to “NJ”
FULLFIPSID	ID of containing census block from Year 2010 Census Bureau TigerLine reference data
SHAPE	Created using ESRI ArcDesktop

Internal notes on processing:

27. Used the provider name, DBA name, and FRN from FCC Form 477 reference data.
28. The following steps were performed for the October 2011 submission and the results re-used here:
    a. Geocoded the address to obtain a Latitude, Longitude value pair. All middle-point addresses were successfully geocoded using Arroyo with Yahoo geocoder.
    b. Imported the resulting data to a geodatabase table.
    c. Added a point for the Latitude, Longitude pair by creating a feature class from the table using ArcCatalog’s “Create Feature Class from XY Table” option.
    d. Added a column containing the ID of the containing year 2010 census block via a spatial join of the points and the census block shapes from reference data. All records successfully spatially joined on 2010 NJ Census Block shapes.
29. Based on provider email response, set ownership value to leased.
30. Loaded 2 records.

Section 5: Clarification Questions and Responses

```
Subject:    RE: NJ Broadband Data Collection - Spring 2013
Date: Mon, 7 Jan 2013 17:21:08 -0500
From: Ray Wood <RayW@nbsvoice.com>
To:   Connecting NJ <ConnectingNJ@appcomsci.com>


Hello,
```

There have been no changes since the last time we submitted info (July - 2012).

Can you please resubmit the info used then.

Thank you,

Ray Wood

From: Ray Wood [mailto:RayW@nbsvoice.com]
Sent: Wednesday, February 22, 2012 4:07 PM
To: NJ Broadband Data Collection
Cc: shelley.bates@oit.state.nj.us
Subject: FW: Reminder - NJ Broadband Data Collection

John/Shelley,

Nothing has changed on our end – sorry this is late, in this chain you will see my other responses.

If this does not suffice, please let me know.

Ray Wood
NBS
973-638-2155

From: Ray Wood
Sent: Tuesday, August 16, 2011 3:11 PM
To: 'ConnectingNJ@research.telcordia.com'
Cc: shelley.bates@oit.state.nj.us
Subject: RE: Reminder - NJ Broadband Data Collection

This is what I submitted – I think last summer.

Does this suffice?

To: Telcordia (NJ BB Data Collection)
From: Ray Wood (NBS, Product Manager).
Re: NJ BB Data Collection

I believe that we qualify for the BB Data Collection. However, what we do have that qualifies is only a portion of our business.

I don't believe we qualify as a fixed broadband or mobile broadband service provider.

However, we probably do qualify as a middle mile infrastructure provider.

We have a fiber ring that runs through the addresses listed below:

60 Hudson Street
NY, NY
(Carrier Hotel)

155 Halsey Street
Newark, NJ 07102
(Carrier Hotel)

282 Main Street
Little Ferry NJ
(Verizon Central Office)

We can offer bandwidth increments from T1 to OC-48.

Please let me know if you require further detail on this.

Thank you,

Ray Wood
Product Manager
NBS
973-638-2155

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Wednesday, February 22, 2012 5:57 PM
To: 'Ray Wood'; 'NJ Broadband Data Collection'
Cc: 'shelley.bates@oit.state.nj.us'
Subject: RE: Reminder - NJ Broadband Data Collection

Ray,
This is great. The NTIA is collecting data every six months, and wants us to get revised data or verify previous data.

A couple of clarifications:

1. I am assuming you lease space at these facilities, rather than own them. Is that true in all three cases?
2. When you say you can offer T1 to OC-48, how is that configured? Do you resell facilities from other providers to connect to your locations?

John Wullert
Manager - NJ BB Data Collection
Applied Communication Sciences
732-699-2687

From: Ray Wood [mailto:RayW@nbsvoice.com]
Sent: Wednesday, February 22, 2012 6:00 PM
To: NJ Broadband Data Collection
Cc: shelley.bates@oit.state.nj.us
Subject: RE: Reminder - NJ Broadband Data Collection

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Wednesday, February 22, 2012 5:57 PM
To: Ray Wood; 'NJ Broadband Data Collection'

Cc: shelley.bates@oit.state.nj.us
Subject: RE: Reminder - NJ Broadband Data Collection

Ray,
This is great. The NTIA is collecting data every six months, and wants us to get revised data or verify previous data.

A couple of clarifications:

1. I am assuming you lease space at these facilities, rather than own them. Is that true in all three cases?

Yes.

2. When you say you can offer T1 to OC-48, how is that configured?

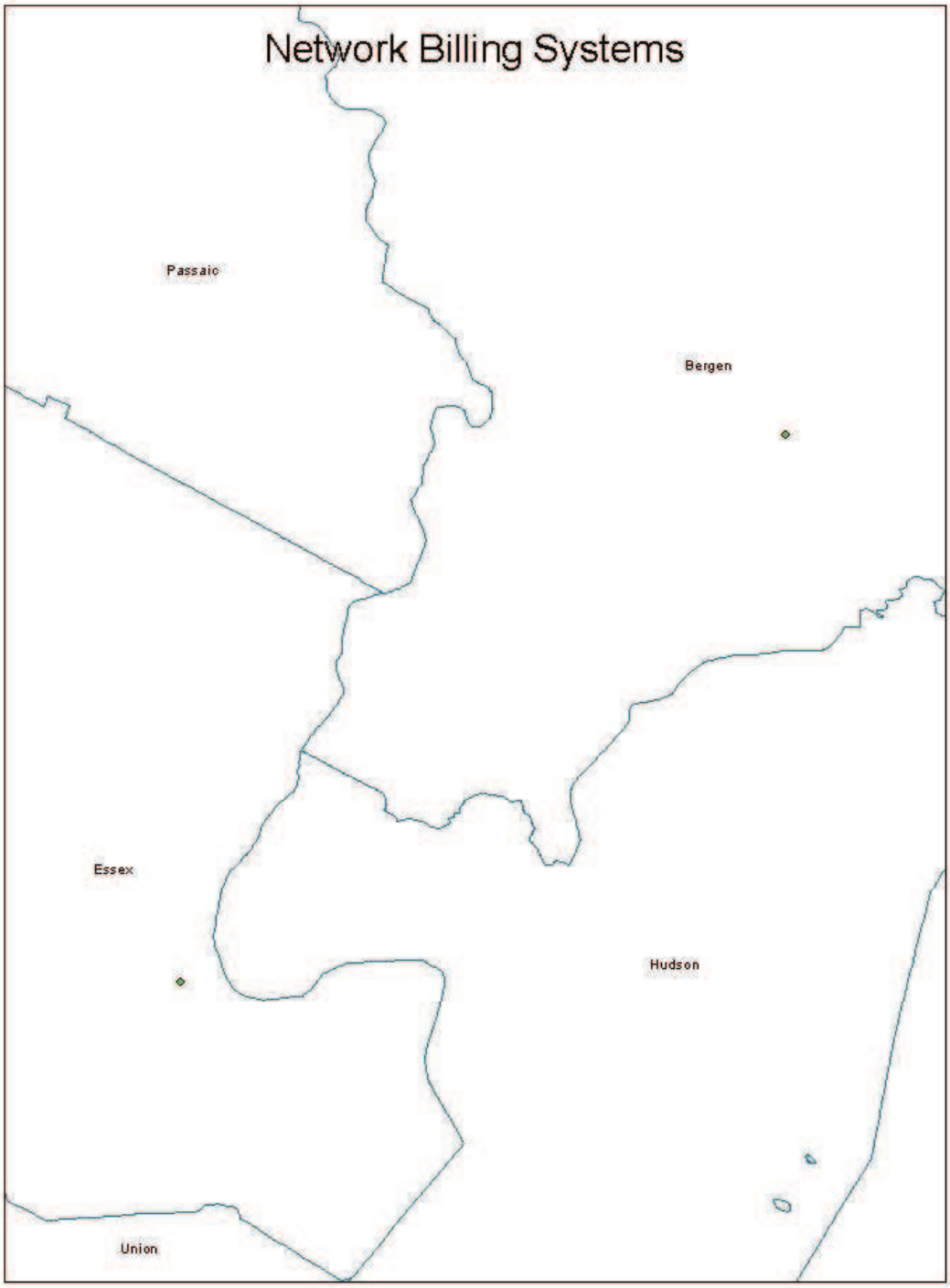
I don't understand.

Do you resell facilities from other providers to connect to your locations?

Yes.

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



Connecting New Jersey - Broadband Provider Data Report

Provider: Netcarrier
Received: March 2013
Submission date: April 2013

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

For April 2013:
Netcarrier only provided the Address Level data for this round, processing of which is outlined in the corresponding section of this document. As we are going to reuse data from previous submissions for the Middle Mile table, corresponding sections are copied from the previous Provider Data Report.

Section 1: NDA Status

Section 2: Submission Overview

<table>
<tr><th colspan="4">AVAILABILITY DATA</th></tr>
<tr><td>ID</td><td colspan="2">Provider name
“Doing business as” name
FRN</td><td>Netcarrier
Netcarrier Telecom, Inc.
0005043195</td></tr>
<tr><th colspan="4">FOR WIRELINE</th></tr>
<tr><td>Filetypes</td><td colspan="3">Excel</td></tr>
<tr><td>File size</td><td colspan="3">119 KB (595 rows)</td></tr>
<tr><td>Speeds</td><td colspan="2"><table>
<tr><th>Type</th><th></th><th>Spatial Resolution: address</th></tr>
<tr><td>Typical-upstream</td><td></td><td>Address-level</td></tr>
<tr><td>Typical-downstream</td><td></td><td>Address-level</td></tr>
<tr><td>Advertised-upstream</td><td></td><td>Address-level</td></tr>
<tr><td>Advertised-downstream</td><td></td><td>Address-level</td></tr>
<tr><td>Subscriber-weighted-up</td><td></td><td>Not provided</td></tr>
<tr><td>Subscriber-weighted-down</td><td></td><td>Not provided</td></tr>
</table></td><td>Provides a .xls file with 895 rows of information (end user addresses).</td></tr>
<tr><td>Technology Type</td><td colspan="3">Types: 10, 30, 50</td></tr>
<tr><td>End-user specification</td><td colspan="3">Address level.</td></tr>
</table>

Comments: 1. This pertains to the data received in previous rounds. 2. Provider did not respond to requests for revised information for Spring 2012 submission. Their Web site indicates that they offer T1/T3 and fiber-based services. They do not specifically list ADSL. They do offer fractional T1 services, indicating that they could potentially support new customers at existing locations. Based on this information, it was decided to reuse their prior data for this round.	
INTERCONNECTION DATA	
ID	NJ_Broadband_Mapping-Backbone-090711
File size	12 kb
Ownership	Not provided
Transport Type	Facility type provided (code 1 and 2 used)
Data Rates/Capacity	Not provided
Location	Provided by street address (elevation provided as well)
Comments: 2 other fields called V-COORD and H-COORD (5 digit #'s) are provided.	

Section 3: Submission File Details

Received 1 file by secure upload:

Size	Name
195 kb	477 Workbook-013113-broadband only-NJBroadband.xls

Section 4: Data Transformation and Loading

The following describes the processing applied to load the tables

NTIA Table BB_ConnectionPoint_MiddleMile

Since there is no change, we copied the 2012 October middle mile data.

This pertains to data processed in previous rounds.

Loaded from the supplied Excel Spreadsheet. The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	As supplied in column "Provider Name" but changed "c" to "C"
DBANAME	As supplied in column "DBA" but changed "c" to "C"

FRN	As supplied in column “FRN”
OWNERSHIP	As provided in column “Ownership”
BHCAPACITY	As provided in column “Serving Facility Capacity”
BHTYPE	As provided in column “Serving Facility Type”
LATITUDE	As computed from address
LONGITUDE	As computed from address
ELEVFEET	Set to “0” (zero); values such as “Fl 1” were not parsed
STATEABBR	Set to “NJ”
FULLFIPSID	ID of containing census block from Year 2010 Census Bureau TigerLine reference data
SHAPE	Created using ESRI ArcDesktop

Internal notes on processing:

31. Used the provider name, DBA name, and FRN as supplied.
32. Following steps were performed for Fall 2011 submission and the results reused:
    a. Geocoded the address to obtain a Latitude, Longitude value pair. All middle-point addresses were successfully geocoded using Arroyo with Yahoo geocoder.
    b. Imported the resulting data to a geodatabase table.
    c. Added a point for the Latitude, Longitude pair by creating a feature class from the table using ArcCatalog’s “Create Feature Class from XY Table” option.
    d. Added a column containing the ID of the containing year 2010 census block via a spatial join of the points and the census block shapes from reference data. All records successfully spatially joined on 2010 NJ Census Block shapes.
    e. Loaded 11 records.
33. These records were copied over into a new BB_ConnectionPoint_MiddleMile table
34. Results passed all NTIA validations.

NTIA Table BB_Service_CensusBlock

The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	Not supplied, taken from the previous round data.
DBANAME	Not supplied, taken from the previous round data.
PROVIDER_TYPE	Set to “1”
FRN	Not supplied, taken from the previous round data.
STATEFIPS	Set to “34” (NJ)
COUNTYFIPS	Populated from Census Block FIPS Code (first 3 digits)
TRACT	Populated from Census Block FIPS Code (next 6 digits)
BLOCKID	Populated from Census Block FIPS Code

FULLFIPSID	Populated from Census Block FIPS Code
TRANSTECH	Take from column “Technology Code”, after transformation (see below)
MAXADDOWN	Take from column “Download Speed”, after transformation (see below)
MAXADUP	Take from column “Upload Speed”, after transformation (see below)
TYPICDOWN	Set to null (see below)
TYPICUP	Set to null (see below)
ENDUSERCAT	Set to null (see below)
SHAPE	Copied from Census Bureau TigerLine 2010, as matched by spatial join on geocoded address

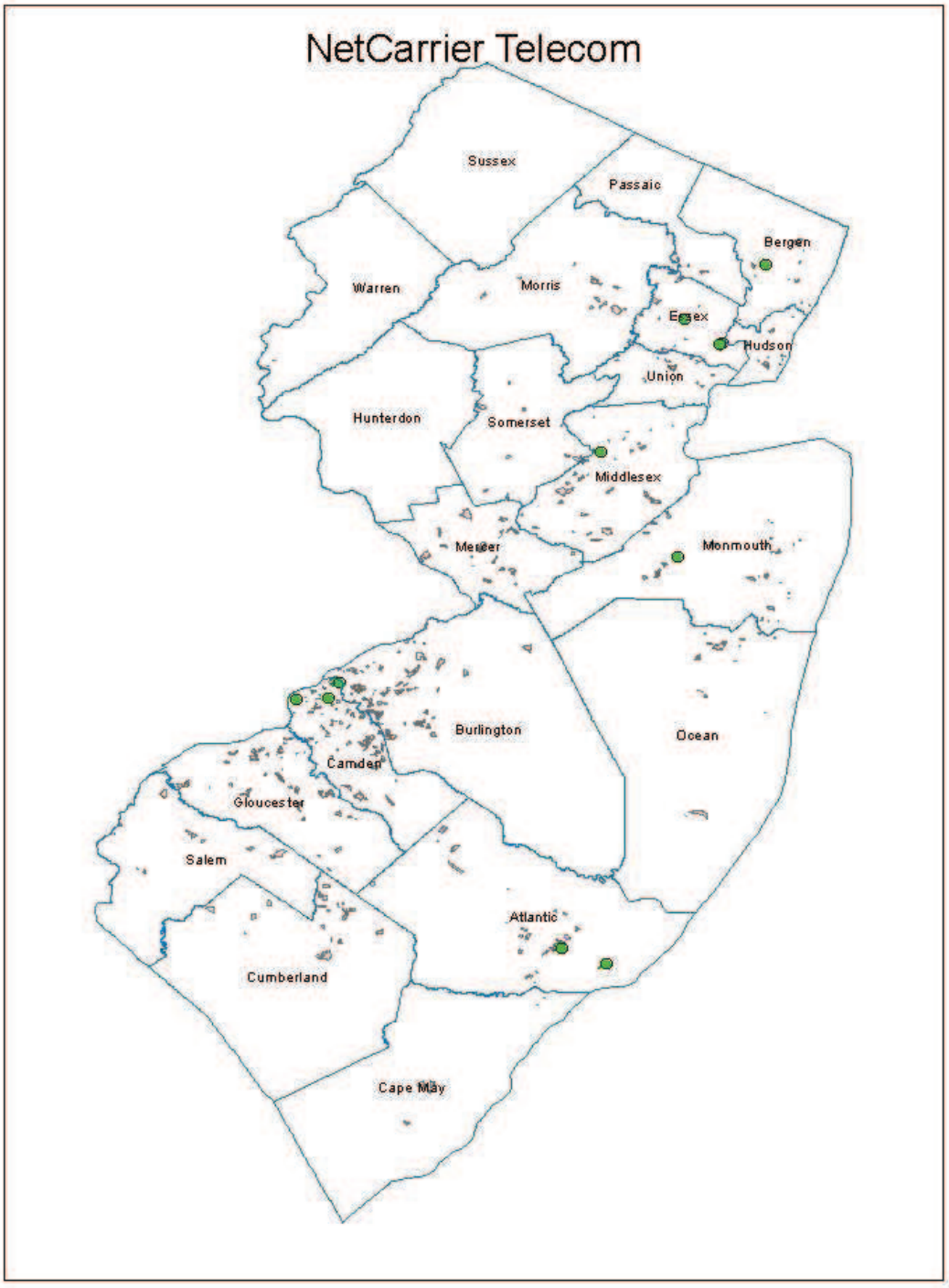
Internal processing notes:

36. Following steps were performed for the April 2013 submission:
    a. Geocoded the addresses using an Arroyo flow and the Yahoo geocoder, leaving the result with address and lat, long data in an Excel spreadsheet. All addresses (793) were successfully geocoded.
    b. Imported the spreadsheet to a simple ESRI geodatabase table
    c. Added point shapes corresponding to each Latitude,Longitude pair by creating a feature class from the table using ArcCatalog’s “Create Feature Class from XY Table” option
    d. Added a column containing the ID of the containing year 2010 census block using ArcCatalog's spatial join feature. The newly created point shapes are joined against census block shapes from reference data. All but three records successfully spatially joined on 2010 NJ Census Block shapes.
    e. Discarded 286 duplicate census block records, which result from multiple addresses in the same census block.
    f. Discarded 1 large census block record.
    g. Loaded 506 records.
37. Copied result into new BB_Service_CensusBlock

Section 5: Clarification Questions and Responses

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data\



Connecting New Jersey - Broadband Provider Data Report

Provider: Service Electric Cable TV of Hunterdon
Received: August 2010/April 2012
Submission date: April 2013

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

For April 2013:
This is a stub report, since data from the previous submission was reused unchanged. The complete report from the previous submission begins on the next page. Notable differences from the processing done on the previous submission are listed next.

Processing Steps:

5. Used ESRI: Data Management Tools->General->Append with NO_TEST schema type to copy svcelechunterdon_oct2012.BB_Service_CensusBlock to svcelechunterdon_apr2013. BB_Service_CensusBlock.
6. Same is applied to svcelechunterdon_apr2013.BB_Service_RoadSegment and BB_ConnectionPoint_MiddleMile.

For October 2012:
This is a stub report, since data from the previous submission was reused unchanged. The complete report from the previous submission begins on the next page. Notable differences from the processing done on the previous submission are listed next.

Section 1: NDA Status

None.

Section 2: Submission Overview

AVAILABILITY DATA				
ID	Provider name "Doing business as" name FRN			Service Electric Cable TV of Hunterdon, Inc. DBA not provided 0003760014
FOR WIRELINE				
Filetypes	Text (a letter, not structured data)			
File size				
Speeds	Type		Spatial Resolution (address, street seg,	In telephone conversation, provider indicated that their footprint has not changed from

			census block, RSA/MSA, zipcode,etc)	previous submissions, that speeds were 15 Mbps down and 1 Mbps up. While they are testing DOCSIS 3.0, it is not yet available commercially for residential customers. In previous submissions, provider had given a list of municipalities that they covered completely.
	Typical-upstream		Not provided	
	Typical-downstream		Not provided	
	Advertised-upstream		Municipality	
	Advertised-downstream		Municipality	
	Subscriber-weighted-up		Not provided	
	Subscriber-weighted-down		Not provided	
Technology Type	Docsis 2.0 (use code 41)			
End-user specification	Not provided			
Comments: Provider also indicated they deliver fiber service to business customers, but were not in a position to deliver location data for this round. We will pursue this further for the next round.				
INTERCONNECTION DATA				
ID				
File size				
Ownership	Leased			
Transport Type	Fiber			
Data Rates/Capacity	1 Gbps			
Location	List of addresses			
Comments: In telephone conversation, Provider described locations of interconnection huts and provided information on technology and speeds.				

Section 3: Submission File Details

Received email for October submission with information on the municipalities served in entirety, the technology of transmission, and the speed tiers offered to customers. Confirmed that information via phone on March 4, 2011

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_ConnectionPoint_MiddleMile

The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	Set to “Service Electric Cable TV of Hunterdon, Inc.”
DBANAME	Not supplied; set same as PROVNAME
PROVNAME	As supplied
DBANAME	As supplied
FRN	Set to “0003760014”
OWNERSHIP	Set to 1 for leased
BHCAPACITY	Set to 4 for 1 Gbps
BHTYPE	Set to 1 for fiber
LATITUDE	Obtained by geo-coding addresses
LONGITUDE	Obtained by geo-coding addresses
ELEVFEET	Set to “0” (zero)
STATEABBR	Set to “NJ”
FULLFIPSID	ID of containing census block from Year 2010 Census Bureau TigerLine reference data
SHAPE	Created using ESRI ArcDesktop

Internal notes on processing:

1. Provider gave a set of addresses. These addresses were geo-coded using Google geo-coder into an Excel spreadsheet.
2. Imported the Excel sheet to a geo-database table.
3. Added point for the Latitude, Longitude pair by creating a feature class from the table using ArcCatalog’s “Create Feature Class from XY Table” option.
4. Mapped to separate shape file to correct tolerance.
5. Added a column containing the ID of the containing year 2010 census block via a spatial join of the points and the census block shapes from reference data.

NTIA Table BB_Service_CensusBlock

Loaded based on email received on August 23, 2010. We submitted all census blocks in the named municipalities. The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	Set to “Service Electric Cable TV of Hunterdon, Inc.”
DBANAME	Not supplied; set same as PROVNAME
RESELLER	Set to “N”
FRN	Set to “0003760014”
STATEFIPS	Set to “34” (NJ)
COUNTYFIPS	Populated from Census Block FIPS Code (first 3 digits)
TRACT	Populated from Census Block FIPS Code (next 6 digits)
BLOCKID	Populated from Census Block FIPS Code

BLOCKSUBGROUP	Set to null
FULLFIPSID	Populated from Census Block FIPS Code
TRANSTECH	Set to 41 (Cable Modem – Other) per email Docsis-2.0
MAXADDOWN	Set to 7 (15 Mbps) per email
MAXADUP	Set to 3 (1 Mbps) per email
TYPICDOWN	Set to null, not provided
TYPICUP	Set to null, not provided
SHAPE	Copied from Census Bureau TigerLine 2000, as matched by spatial join on geocoded address

Internal processing notes:

38. Following steps were performed for October 2011 submission
    a. Created a file with municipality names that match exactly names in the "name" column in the Year 2000 Census Bureau TigerLine database. Primarily this meant changing "Boro" to "Borough".

Municipality	**County**
Alexandria Township	Hunterdon
Alpha Borough	Warren
Bloomsbury Borough	Hunterdon
Frenchtown Borough	Hunterdon
Greenwich Township	Warren
Harmony Township	Warren
Holland Township	Hunterdon
Kingwood Township	Hunterdon
Lopatcong Township	Warren
Milford Borough	Hunterdon
Phillipsburg	Warren
Pohatcong Township	Warren

    b. Joined against municipalities against reference data to identify corresponding list of census blocks.
39. Ran all NTIA validations.

NTIA Table BB_Service_RoadSegment

Loaded with street segments in census blocks larger than 2 square miles as listed in Census Bureau TigerLine reference data. The following table explains the transformations that were applied to load the target table.

Table Column	**Data Source / Transformation**
PROVNAME	Set to "Service Electric Cable TV of Hunterdon, Inc."
DBANAME	Not supplied; set same as PROVNAME
RESELLER	Set to "N"
FRN	Set to "0003760014"

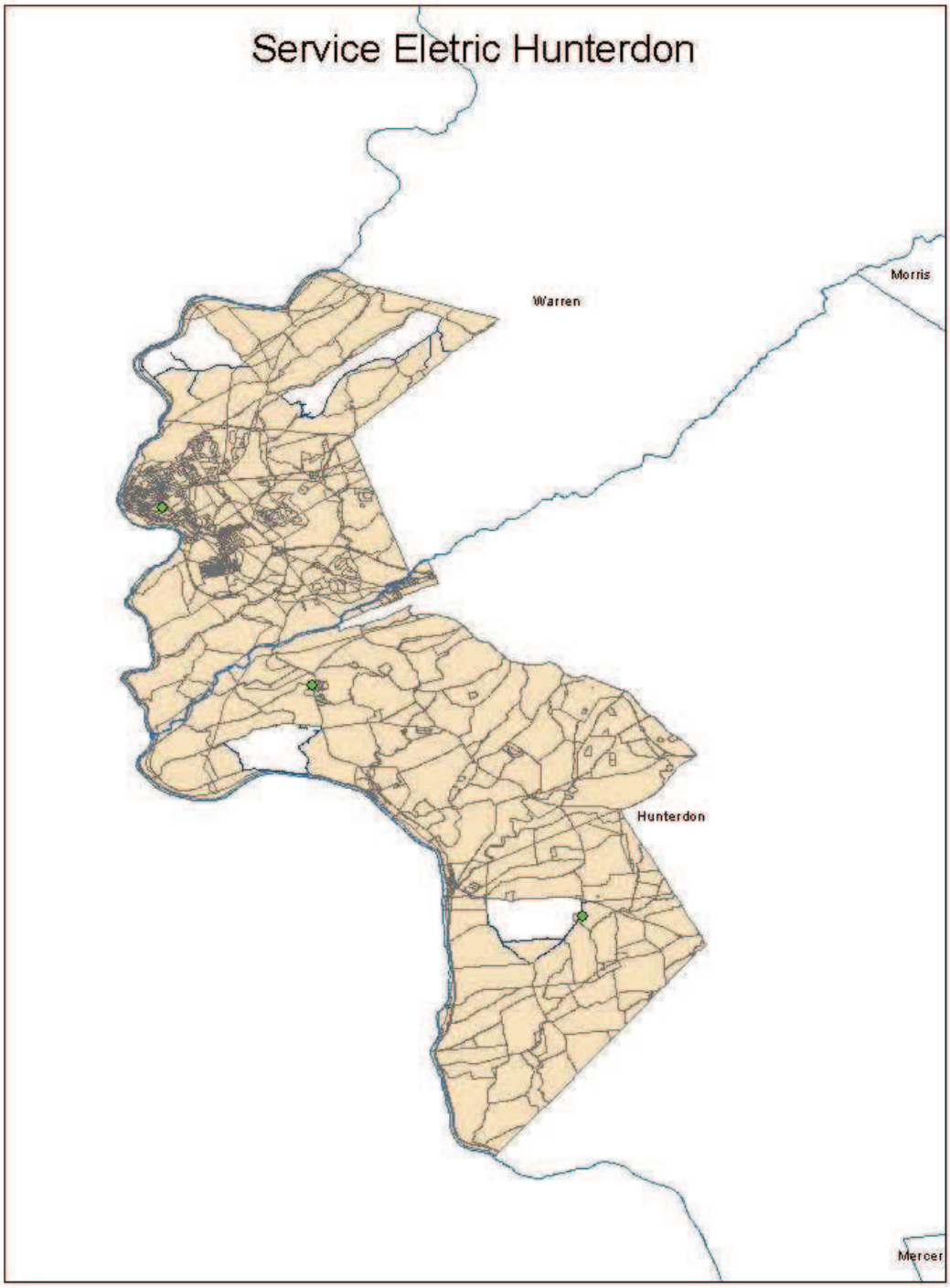
ADDMIN	From reference data
ADDMAX	From reference data
PREDIR	From reference data
STREETNAME	From reference data
STREETTYPE	From reference data
SUFFDIR	From reference data
CITY	From reference data
STATECODE	From reference data
ZIP5	From reference data
ZIP4	From reference data
TRANSTECH	Set to 41 (Cable Modem – Other) per email Docsis-2.0
MAXADDOWN	Set to 7 (10Mbps) per email
MAXADUP	Set to 3 (800Kbps) per email
TYPICDOWN	Set to null, not provided
TYPICUP	Set to null, not provided
SHAPE	From reference data

Section 5: Clarification Questions and Responses

Section 6: Notes and Open Issues

Their data remains the same, so resubmit previous data. HOWEVER, they will be making significant changes to their service offering between now and the Fall, i.e., from DOCSIS 2 to DOCSIS 3, from 15x2 to 50x5.

Section 7: Overview Map of Submitted Data



Connecting New Jersey - Broadband Provider Data Report

Provider: Service Electric Cable TV of Sparta
Received: March 2012
Submission date: April 2013

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

For April 2013:
This is a stub report, since data from the previous submission was reused unchanged. The complete report from the previous submission begins on the next page. Notable differences from the processing done on the previous submission are listed next.

Processing Steps:

7. Used ESRI: Data Management Tools->General->Append with NO_TEST schema type to copy svcelecsparta_oct2012.BB_Service_CensusBlock to svcelecsparta _apr2013. BB_Service_CensusBlock.
8. Same is applied to svcelecsparta_apr2013.BB_Service_RoadSegment and BB_ConnectionPoint_MiddleMile.

For October 2012:
This is a stub report, since data from the previous submission was reused unchanged. The complete report from the previous submission begins on the next page. Notable differences from the processing done on the previous submission are listed next.

Section 1: NDA Status

No NDA executed.

Section 2: Submission Overview

<table>
<tr><td colspan="5">AVAILABILITY DATA</td></tr>
<tr><td>ID</td><td colspan="2">Provider name
“Doing business as” name
FRN</td><td colspan="2">Service Electric Cable TV of NJ Inc.
Service Electric Broadband Cable
0005007125</td></tr>
<tr><td colspan="5">FOR WIRELINE</td></tr>
<tr><td>Filetypes</td><td colspan="4">Text</td></tr>
<tr><td>File size</td><td colspan="4">9728 bytes</td></tr>
<tr><td>Speeds</td><td>Type</td><td></td><td>Spatial Resolution (address, street seg, census block, RSA/MSA,</td><td>Provided list of municipalities they serve. Provider indicated that they do not cover all streets in the rural area they serve. Rather than overstate</td></tr>
</table>

			zipcode,etc)	coverage, we elected to omit streets in large census blocks that are more likely to represent rural areas. Provider indicated in email exchange that they offer DOCSIS 3.1 over their entire footprint. He provided list of speeds, which we confirmed with him.
	Typical-upstream		Not provided	
	Typical-downstream		Not provided	
	Advertised-upstream		Municipality	
	Advertised-downstream		Municipality	
	Subscriber-weighted-up		Not provided	
	Subscriber-weighted-down		Not provided	
Technology Type	Docsis 3.1 (will use code 40)			
End-user specification	Not provided			
Comments:				
INTERCONNECTION DATA				
ID				
File size	Several addresses provided			
Ownership	Owned			
Transport Type	Fiber			
Data Rates/Capacity	One says “Fiber 10 gbps”; others have no statement - Clarified this via email. See answers below.			
Location	Address			
Comments:				

Section 3: Submission File Details

Received one (1) file by EMAIL:

Size **Name**
9728 Broadband data Information.xls

Received a spreadsheet with information on the municipalities served in entirety, the technology of transmission, the modem speeds offered to customers, and some connection points.

We will gather all the census blocks in the municipality based on the TigerLine reference data and report those shapes in the BB_service_censusblock table.

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_ConnectionPoint_MiddleMile

Loaded from 8 rows in the supplied Excel spreadsheet. The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	Set to "Service Electric Cable TV of NJ Inc." per email response
DBANAME	Set to "Service Electric Broadband Cable" per email response
FRN	Set to "0005007125" per email response
OWNERSHIP	Set to 0 to indicate owned
BHCAPACITY	Set to 6 or 4, see below
BHTYPE	Set to 1, provider indicated fiber.
LATITUDE	Created by geocoding the supplied address
LONGITUDE	Created by geocoding the supplied address
ELEVFEET	Set to "0" (zero)
STATEABBR	Set to "NJ"
FULLFIPSID	ID of containing census block from Year 2000 Census Bureau TigerLine reference data
SHAPE	Created using ESRI ArcDesktop

Internal notes on processing:

6. Following steps were performed during prior submission
    a. Created an excel sheet and imported to a geodatabase table.
    b. Added points corresponding to each Latitude,Longitude pair by creating a feature class from the table using ArcCatalog's "Create Feature Class from XY Table" option.
    c. Added a column containing the ID of the containing year 2000 census block via a spatial join of the points and the census block shapes from reference data.
7. Provider indicated that two sites are served by dual 10 Gbps links (code 6) and the rest are served by dual 2 Gbps links (code 4).

NTIA Table BB_Service_CensusBlock

Loaded based on the supplied file "Broadband data Information.xls". We submitted all census blocks less than 2 square miles in the named municipalities. The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	Set to "Service Electric Cable TV of NJ Inc." per email response

DBANAME	Set to “Service Electric Broadband Cable” per email response
PROVIDER_TYPE	Set to 1
FRN	Set to “0005007125” per email response
STATEFIPS	Set to “34” (NJ)
COUNTYFIPS	Populated from Census Block FIPS Code (digits 3-5)
TRACT	Populated from Census Block FIPS Code (next 6 digits)
BLOCKID	Populated from Census Block FIPS Code (next 5 digits)
BLOCKSUBGROUP	Set to null
FULLFIPSID	Populated from Census Block FIPS Code
TRANSTECH	Set to 40 per file (DOCSIS 3.0)
MAXADDOWN	Set to code 8 as reported by provider
MAXADUP	Set to code 5 as reported by provider
TYPICDOWN	Set to null, not provided
TYPICUP	Set to null, not provided
SHAPE	Copied from Census Bureau TigerLine 2010, as matched by spatial join on geocoded address

Internal processing notes:

40. Created a file with municipality names supplied by provider in a form that match exactly names the “name” column in the Year 2010 Census Bureau TigerLine database. Primarily this meant changing “Boro” to “Borough”.
41. Joined against reference data to discover census blocks, for a total of 4,135 blocks.

NTIA Table BB_Service_RoadSegment

Loaded with street segments in census blocks larger than 2 square miles as gathered from Census Bureau TigerLine reference data. The following table explains the transformations that were applied to load the target table.

Table Column	**Data Source / Transformation**
PROVNAME	Set to “Service Electric Cable TV of NJ Inc.” per email response
DBANAME	Set to “Service Electric Broadband Cable” per email response
PROVIDER_TYPE	Set to 1
FRN	Set to “0005007125” per email response
ADDMIN	From reference data
ADDMAX	From reference data
PREDIR	Set to null, not available in reference data
STREETNAME	From reference data
STREETTYPE	Set to null, not available in reference data
SUFFDIR	Set to null, not available in reference data
CITY	From reference data
STATECODE	Set to "NJ"
ZIP5	From reference data

ZIP4	Set to null, not available in reference data
TRANSTECH	Set to 40 (DOCSIS 3.0)
MAXADDOWN	Set to code 8 as reported by provider
MAXADUP	Set to code 5 as reported by provider
TYPICDOWN	Set to null, not provided
TYPICUP	Set to null, not provided
SHAPE	From reference data

Internal processing notes:

1. Discovered all street segments that touch census blocks larger than 2 square miles in the municipalities served by the provider as discussed for table BB_Service_Censusblock.
2. Joined against reference data to discover street segment, for a total of 2,223 entries.

Validation rules produced a warning on 5265 census blocks and 985 street segments for the combination of a downstream speed code of 8 (25-50 Mbps) with a transtech code of 40 (DOCSIS 3.1). Provider was not willing to commit that they offered anything faster. Internet search confirms that the fastest speed they advertise is 35 Mbps down and 3 Mbps up.

Section 5: Clarification Questions and Responses

From: James Galliford [mailto:jamesg@secable.com]
Sent: Monday, March 05, 2012 4:04 PM
To: Fiuk, Marek J
Cc: Wullert, John R II
Subject: Re: Tiger lines

Marek,

Thank you for your understanding.

These are the changes in speeds:

- 1.5/256 -> 2.0/256
- 7/1 -> 8/1
- 12/2 - 15/2
- 35/3 - No Change

We are going to work on compiling the detailed information using information that apparently has become available from our billing system recently. As soon as we get this information, we'll pass it on to you.

Thanks again.

-James

On 3/12/12 12:30 PM, Fiuk, Marek J wrote:
James,

Thank you for your cooperation in providing us with data needed for the forthcoming New Jersey Broadband submission.
While processing your data we have encountered some issues that we would like to clarify with you, in order to assure the best possible quality of the information we are going to submit.
You have provided us with a list of speed tiers that you support. Are all these speeds (in particular, the highest one) advertised in ALL municipalities from the list you supplied to us ?
If this is not the case, would you be able to provide the speed list on the per-municipality basis?

We also have a similar question regarding the cable technology - DOCSIS 3.0 and DOCSIS 1.1. Our current understanding is that you provide both of these in all covered municipalities. Is that correct ? If not, would you be able to provide us with the per-municipality list?

Regards,

Marek Fiuk

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data

Connecting New Jersey - Broadband Provider Data Report

Provider: Skycasters, LLC
Received: September 2012
Submission date: April 2013

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

For April 2013:
This is a stub report, since data from the previous submission was reused unchanged. The complete report from the previous submission begins on the next page. Notable differences from the processing done on the previous submission are listed next.

Processing Steps:

9. Although it appears that the shape is inside of the NJ site, we did clip it as this is an important issue to NTIA. Clipped skycasters_oct2012.BB_Service_Wireless using ESRI: Analysis Tools-> Extract -> Clip with, select feature class refdata_2010.tl_2010_34_state10_wgs. The feature class has the suffix "_Clip".
10. Used ESRI: Data Management Tools->General->Append with NO_TEST schema type to copy skycasters_oct2012.BB_Service_Wireless_Clip to skycasters_apr2013.BB_Service_Wireless.

For October 2012:

Section 1: NDA Status

NONE

Section 2: Submission Overview

<table>
<tr><td colspan="4">AVAILABILITY DATA</td></tr>
<tr><td>ID</td><td colspan="2">Provider name
“Doing business as” name
FRN</td><td>Skycasters, LLC
Skycasters, LLC
0018756155</td></tr>
<tr><td colspan="4">FOR WIRELESS</td></tr>
<tr><td>Filetypes</td><td colspan="2">Excel file with data gleaned from the Skycasters WEB site</td><td></td></tr>
<tr><td>Speeds</td><td>Type</td><td>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode)</td><td rowspan="3">Skycasters WEB site lists multiple speed plans, the highest speed combination offered is 6.09M / 1.5M</td></tr>
<tr><td>Upstream max adv</td><td>1.5M</td></tr>
<tr><td>Downstream max adv</td><td>6.09M</td></tr>
</table>

	Upstream typical		
	Downstream typical		
	Subscriber-weighted		
Technology Type	Code 60 (Satellite)		
Comments: Skycasters WEB site indicates that Ku-Band (12-18 GHz) satellites are being used. None of the spectrum ranges available in the NTIA document covers Ku-Band.			
INTERCONNECTION DATA			
ID			
File size			
Ownership			
Transport Type			
Data Rates/Capacity			
Location			
Comments:			

Section 3: Submission File Details

The Excel file was created from data gleaned from the Skycasters WEB site: http://www.skycasters.com/satellite-internet-coverage/skycasters-coverage-NewJersey.html

There are 729 records. The file has latitude and longitude for county, city, zip code, and area code. It looks like the latitude and longitude is a centroid of area codes. Since we do not have shape files for area codes, we will use the latitude and longitude as a centroid of zip codes.

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_Service_Wireless

The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	Set to "Skycasters, LLC"
DBANAME	Set to "Skycasters, LLC"
FRN	Set to 0018756155
TRANSTECH	Set to 60

SPECTRUM	Set to 9 per translation shown below
MAXADDOWN	Set to 6.
MAXADUP	Set to 4.
TYPICDOWN	Not provided, set to null
TYPICUP	Not provided, set to null
STATEABBR	Set to “NJ”
SHAPE	Single shape created from Municipalities (see below).

Internal notes on processing:

11. The excel sheet is imported to a geodatabase table.
12. Added point shapes corresponding to each Latitude, Longitude pair by creating a feature class from the table using ArcCatalog’s “Create Feature Class from XY Table” option. The name is skycasters_cov.
13. Refdata.nj_zip_poly_wgs is our reference data that contains shapes for zip codes in NJ. Spatial join nj_zip_poly_wgs with skycasters_cov, using the “contains match” option and unselecting “keep all target features”. The output is skycasters_cov_zip_poly. This is a subset of the nj_zip_poly_wgs table that contains the points in the skycasters_cov table.
14. Coalesced the single-part polygons into one multi-part polygon using the ArcGIS “Dissolve” tool, which resulted in a new feature class with the suffix “_dissol”.
15. Spectrum: Skycasters uses Ku-Band spectrum (12-18 GHz band). While this is not specifically included in the list of satellite frequencies associated with Code 9, we used code 9 anyway. This is consistent with the approach taken for WildBlue.

Section 5: Clarification Questions and Responses

Subject: RE: NJ Broadband Data Collection – Spring 2013
Date: Mon, 7 Jan 2013 20:52:23 +0000
From: Trisa Struckman <trisa.struckman@satventuresmanagement.com>
To: Connecting NJ <ConnectingNJ@appcomsci.com>

Please note that there have been no changes in our service or coverage areas, everything has remained the same.

Thanks MUCH~!

Trisa

> from SBDD Grantee Workspace

<https://sbdd-granteeworkspace.pbworks.com/> activity-thumb

<https://sbdd.pbworks.com/n/users/profile?uid=2478ac959c4cb82332e1cbe48d38c6ce49fd00b8>
Melony Liebel
<https://sbdd.pbworks.com/n/users/profile?uid=2478ac959c4cb82332e1cbe48d38c6ce49fd00b8>commented
on HomePage
<https://sbdd-granteeworkspace.pbworks.com/w/page/25793681/HomePage>
Akins, we recently received a note from NTIA regarding satellite data which questioned our use of spectrum code "10" for this technolgy type. One of our satellite providers reports Ka band for their spectrum used. This band is not provided as an option in the current data model which is the reasonfor our use of the spectrum code 10. Can you please provide guidance on how NTIA would like us to report the Ka band spectrum? We are also looking for guidance regarding satellite providers that are non-responsive to our request for data. Do you want us to do an estimate that shows their presence in the entire state or report them as non-responsive and not submit data for them? Thanks for your help.

> from SBDD Grantee Workspace

Yes, this is a two-pronged issue. The KA band for the spectrum and the fact that Viasat-Wildblue claims 12Mbps downstream speeds, both don't work in the current geodatabase. Currently we are going to use the standard 'satellite' (even though it doesn't include KA band) choice for spectrum and put in tier 7 for downstream speed with a note in the text file, unless we are directed otherwise.

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data

Broadband Provider Data Report

Provider: Sprint
Received: January 2013
Submission date: April 2013

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Sections:

38. NDA Status
39. Submission Overview
40. Submission File Details
41. Data Validations and Results
42. Data Transformation and Loading
43. Clarification Questions and Provider Responses
44. Notes and Open Issues

Section 1: NDA Status

NDA was executed.

Section 2: Submission Overview

<table>
<tr><th colspan="3">AVAILABILITY DATA</th></tr>
<tr><td>ID</td><td>Provider name
“Doing business as” name
FRN</td><td>Sprint Nextel Communications
Sprint
0003-77-45-93</td></tr>
<tr><th colspan="3">FOR WIRELINE</th></tr>
<tr><td>Filetypes</td><td colspan="2">Txt, xls, pdf, etc.</td></tr>
<tr><td>File size</td><td colspan="2">Number of records, data elements</td></tr>
<tr><td>Speeds</td><td colspan="2"><table>
<tr><th>Type</th><th>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode)</th></tr>
<tr><td>Upstream</td><td></td></tr>
<tr><td>Downstream</td><td></td></tr>
<tr><td>Typical</td><td></td></tr>
<tr><td>Advertised</td><td></td></tr>
<tr><td>Subscriber-weighted</td><td></td></tr>
</table></td></tr>
<tr><td>Technology Type</td><td colspan="2">DOCSIS, xDSL, fiber, etc.</td></tr>
</table>

<table>
<tr><td>End-user specification</td><td>Business, consumer, gov’t etc</td><td></td></tr>
<tr><td colspan="3">Comments:</td></tr>
<tr><td colspan="3">FOR WIRELESS</td></tr>
<tr><td>Filetypes</td><td colspan="2">shapefile collection: shp/dbf/prj/shx, mdb, gdb, imagefile etc.</td><td>Supplied a shapefile (zip archive) with a two rows that uses projection GCS_WGS_1984. The actual shape in the archive is a multi-polygon. The 2 rows correspond to spectrums 3 and 5.</td></tr>
<tr><td>Speeds</td><td colspan="2"><table>
<tr><td>Type</td><td>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode)</td></tr>
<tr><td>Upstream max adv</td><td>Single shape, single speed</td></tr>
<tr><td>Downstream max adv</td><td>Single shape, single speed</td></tr>
<tr><td>Upstream typical</td><td>Single shape, single speed</td></tr>
<tr><td>Downstream typical</td><td>Single shape, single speed</td></tr>
<tr><td>Subscriber-weighted</td><td>County; but all values are identical</td></tr>
</table></td><td>Max advertised up 2, down 3; typical upstream 2, down 3.

Max advertised up 3, down 5; typical upstream 3, down 5.</td></tr>
<tr><td>Technology Type</td><td colspan="2">Spectrum (Mhz, FCC code)</td><td>3 and 5 (PCS 1850-1915 MHz, 1930-1995)</td></tr>
<tr><td colspan="3">Comments:</td></tr>
<tr><td colspan="3">INTERCONNECTION DATA</td></tr>
<tr><td>ID</td><td>Provider name
“Doing business as” name
FRN</td><td>Sprint Nextel Corporation
Sprint
0003-77-45-93</td></tr>
<tr><td>File size</td><td>Number of records, data elements</td><td>4</td></tr>
<tr><td>Ownership</td><td>Leased/owned</td><td>Leased = 1, owned = 0</td></tr>
<tr><td>Transport Type</td><td>Fiber, wireless, copper</td><td>Fiber</td></tr>
<tr><td>Data Rates/Capacity</td><td></td><td>2.4 GBPS < < 10GBPS</td></tr>
<tr><td>Location</td><td>Street address, lat/lon, elevation</td><td>Lat/Long</td></tr>
<tr><td colspan="3">Comments:</td></tr>
</table>

DATA COMPLETENESS	
Data Validation/ Verification	- Sprint provided a map showing coverage areas covering the majority of the state of New Jersey - Sprint provided a single set of attribute data, to be applied to the entire coverage area on 2 polygons o They included typical and maximum advertised upload and download speeds - Sprint provided spectrum data

Section 3: Submission File Details

Received these files by upload to the secure web site:

Size	Name
1KB	Confidential_Middlemile_NJ.zip
3724KB	Sprint_AreaAvailability_NJ.zip

The zip archives contained these files:

Name	Size
Confidential_MiddleMile_NJ.txt	1 KB
readme.txt	1 KB
Sprint_AreaAvailability_NJ_region.dbf	2 KB
Sprint_AreaAvailability_NJ_region.prj	1 KB
Sprint_AreaAvailability_NJ_region.shp	5,743 KB
Sprint_AreaAvailability_NJ_region.shx	1 KB

Sprint submitted non-overlapped 2 polygons in the past, in which the higher speed polygon clipped the lower speed polygon. According to the NTIA guidelines (refer to the emails in section 6), it is not recommended. Sprint submitted new data with overlapped polygons.

Second submission with overlapped polygons:

Size	Name
2076KB	Sprint_AreaAvailability_NJ.zip

The zip archives contained these files:

Name	Size

Section 4: Validations and Results

Section 5: Data Transformation and Loading

Loaded 4 rows from the text file “Confidential_Middlemile_NJ.txt” supplied. The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	As supplied in column “provider_name”
DBANAME	As supplied
FRN	As supplied in column “frn”, after removing hyphens
OWNERSHIP	As supplied
BHCAPACITY	As supplied in column “servingfacilitycapacity”
BHTYPE	As supplied in column “servicefacilitytype”
LATITUDE	As supplied
LONGITUDE	As supplied
ELEVFEET	As supplied in column “elevation” (all zero)
STATEABBR	Set to “NJ”
FULLFIPSID	Year 2010 Census Bureau TigerLine reference data
SHAPE	Created via ArcMap “Add XY Data” feature for lat/long value pairs

Internal notes on processing:

8. Removed a space in the longitude of the last line of the input file: "-74.1610 " (This is no longer true in the 2013 April submission.)
9. Created an excel sheet. Import the data from the input file. Save the excel in the 97-2003 format. Make sure the types of latitude and longitude are double.
10. Created a feature class from the table by creating a Point shape using ArcMap’s “Add XY Data” feature corresponding to each Latitude, Longitude pair, using the wgs 1984 coordinate. The name of the feature class is sprint_middlemile_shape_wgs_tol.
11. Added a column containing the census block id of the containing year 2010 census block via a spatial join of the points and the census block shapes from reference data, refdata_2010.tl_2010_34_tabblock10_wgs. The name of the feature class is sprint_middlemile_shape_wgs_tol_cb.
12. The only data imputed was the state abbreviation.

NTIA Table BB_Service_Wireless

Loaded two rows from from the supplied shapefile “Sprint_AreaAvailability_NJ_region. The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	As supplied in column “provider_name”
DBANAME	As supplied in column “dbaname”
FRN	As supplied in column “frn” after removing hyphens
TRANSTECH	As supplied in column “techtrans”
SPECTRUM	Set to 3 or 5 per translation shown below
MAXADDOWN	As supplied in column “maxaddnsp”
MAXADUP	As supplied in column “maxadupsp”
TYPICDOWN	As supplied in column “typdnsp”
TYPICUP	As supplied in column “typupsp”
STATEABBR	Set to “NJ”
SHAPE	As supplied.

Internal notes on processing:

16. The supplied shape uses geographic coordinate system name GCS_WGS_1984 The NTIA data model requires the same coordinate system. No geographic transformation was required, but the XY Tolerance values differ when the shapefile is imported into the geodatabase. Imported the table schema and the table data in two separate operations, thereby ensuring perfect compatibility with the NTIA data model. The table has the suffix “_tol”.
17. NTIA requires shapes to be contained in the NJ state boundary. Although we visually verified that it is the case, we clipped the shape using ESRI: Analysis Tools-> Extract -> Clip with, select feature class refdata_2010.tl_2010_34_state10_wgs. The feature class has the suffix "_clip"
18. The only data imputed was the state abbreviation.

Section 6: Clarification Questions and Responses

Subject: Wireless Data Review Webinar Follow-Up
Date: Fri, 8 Feb 2013 12:19:56 -0500
From: Dorota Wilke <DWilke@ntia.doc.gov>
To: Anne Neville <ANeville@ntia.doc.gov>, Akins Lawal <Alawal@ntia.doc.gov>, Dorota Wilke <DWilke@ntia.doc.gov>
CC: Brian T. Gibbons <BGibbons@ntia.doc.gov>, Lynn Chadwick <LChadwick@ntia.doc.gov>

Dear Grantees,

Thank you for attending the Wireless Data Review webinar that was held on January 23, 2013.

Ultimately, the Program Office would like the grantees to submit a separate, closed polygon whenever there is a variation in any of the required fields. However, if the carrier has already provided clipped wireless coverage data to the maximum advertised speed and it is unclear whether you can assume that the areas that were "clipped out" contain the lesser speed, then we will accept this data for the December 31, 2012 data submission.

The table below represents the wireless data submitted for June 30, 2012 for the four largest wireless providers: AT&T, Sprint, Verizon, and T-Mobile.

- If your state is in any of the providers in row A: No action required.
- If your state is in any of the providers in row B: Request that the provider submit un-clipped data and/or do not clip data if the provider is already submitting unclipped data.
- If your state is in any of the providers in row C: Ensure that you are submitting a closed polygon for any variation in any of the required fields, including spectrum and, depending on the nature of the delivery by the provider and your own knowledge, speed.

Wireless Data Representation	**AT&T** Spectrum Code: 1, 2, 3 Speed Code: 4 (≥1.5 mbps < 3 mbps speed), 5 (≥3 < 6 mbps speed), 7 (≥10 < 25 mbps speed)	**Sprint** Spectrum Code: 3, 5 Speed Code: 3 (≥768 kbps < 1.5 mbps speed), 5 (≥3 < 6 mbps speed)	**Verizon** Spectrum Code: 1, 2, 3, 4, 5 Speed Code: 3 (≥768 kbps < 1.5 mbps speed), 7 (≥10 < 25 mbps speed)	**T-Mobile** Spectrum Code: 4 Speed Code: 4 (≥1.5 mbps < 3 mbps speed), 6 (≥6 < 10 mbps speed), 7(≥10 < 25 mbps speed)
A.Overlapping different speed coverages	Grantees: AL,CA,CO, DC, DE, GA, HI, ID, IL, IN, KS, ME, MD, MS, MO, MT, NE, NV, NH, NJ, NM, NY, PA, PR, RI, SC, SD, TN, VI, WV, WI, WY, VA	Grantees: CA, CT, DC, FL, IL, IN, KS, ME, MD, MI, MN, MO, NE, NV, ND, OH, OK, SC, TN, TX,	Grantees: AL, AZ, AR, CA, CO, CT, DC, DE, FL, GA, HI, ID, IL, IN, IA, KS, KY, LA, ME, MD, MA, MN, MS, MO, MT, NE, NV, NH, NJ, NM, NY, NC, ND, OH, OK, OR, PA, RI, SC, SD, TN, TX, UT, VA, WA, WV, WI, WY	Grantees: AL, AR, CA, DC, DE, FL, GA, HI, ID, IL, IN, IA, KS, MD, MS, MO, NV, NH, NJ, NM, NY, OR, PR, RI, SC, TN, UT, VA, WV, WI
B.Clipping higher speed coverage in to a lower speed coverage **within a spectrum**	Grantees: AK,AZ,AR,CT,FL,IA,KY,LA,MA, MI, MN, NC, ND, OH, OK, OR, TX, UT, VT, WA			Grantees: AZ, CO, CT, KY, LA, MA, MI, MN, NC, OH, OK, PA,TX, WA

C.Clipping higher speed coverage into a lower speed coverage **(these speeds are offered in different spectrums)**		Grantees: CO, DE, GA, HI, ID, KY, MA, NH, NJ, NY, NC, OR, PA, RI, UT, VA, WI	Grantees: MI, VT	

If you have any questions regarding this email, please feel free to contact Dorota Wilke at (202) 482-3878 or Akins Lawal at (202) 482-2738.

Sincerely,

Dorota Wilke
Contractor, State Broadband Initiative
National Telecommunications and Information Administration
U.S Department of Commerce
Tel: (202) 482 - 3878

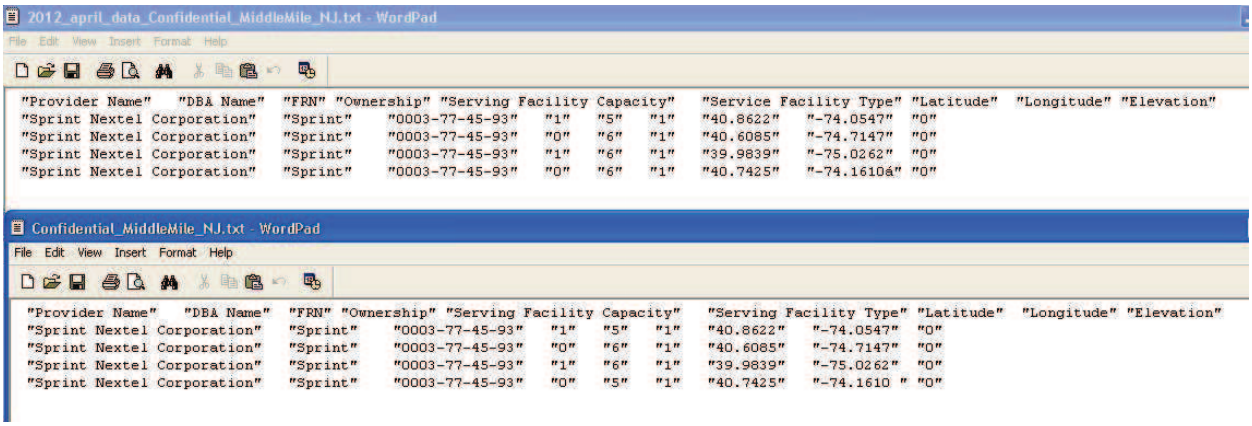
Subject: New maps - New Jersey Broadband Mapping Program Spring 2013 Submission for Sprint
Date: Fri, 1 Feb 2013 19:37:11 +0000
From: Scott, Cyrus J [LEG] <Cyrus.Scott@sprint.com>
To: cbehrens@appcomsci.com <cbehrens@appcomsci.com>, Connecting NJ <ConnectingNJ@appcomsci.com>

Cliff - Several states indicated that NTIA is now requesting carriers to provide overlapping polygons in areas where multiple speeds and spectrum bands are used. In previous submissions only the highest speed polygon was provided for area with multiple tiers. The new maps replace the previous submission to accommodate the NTIA request.

Thank You,

Cyrus Scott
Director, Legal Information Systems and Spectrum Licensing Support Sprint Nextel
12502 Sunrise Valley Drive
Mail Stop VARESA0205-2D101
Reston, VA 20196
Office: (703)433-4229 Wireless: (703)906-3857 cyrus.scott@sprint.com <mailto:cyrus.scott@sprint.com>

The midde mile data is almost identical except the last line has 5 instead of 6 for the “Serving Facility Capacity” column



Subject: RE: NJ BB data update for Fall 2012
Date: Fri, 13 Jul 2012 14:46:42 +0000
From: Delaney, Jack L [LEG] <Jack.Delaney@sprint.com>
To: Connecting NJ <ConnectingNJ@appcomsci.com>

Cliff,

Thanks for alerting me to that. Yes, that's correct. It is a correction. It should have been '5' in the last round. By next round, it should be '6' again, since we are in the process of upgrading the system.

Thanks again,

Jack Delaney
Manager, Systems Operations
Legal Department
Sprint Nextel
Office: 913-315-9705
Cell: 703-906-9533

-----Original Message-----
From: Connecting NJ [mailto:ConnectingNJ@appcomsci.com]
Sent: Friday, July 13, 2012 8:41 AM
To: Delaney, Jack L [LEG]
Subject: NJ BB data update for Fall 2012

Mr. Delaney,

I just wanted to confirm that we have received your data update for the Fall 2012 NJ BB submission to NTIA. Thank you for being "out in front" of this. We do have the following question regarding this update.

As you can see in the attachment, the middle mile data is almost identical to the 2012 April data except the last line has a value of "5"

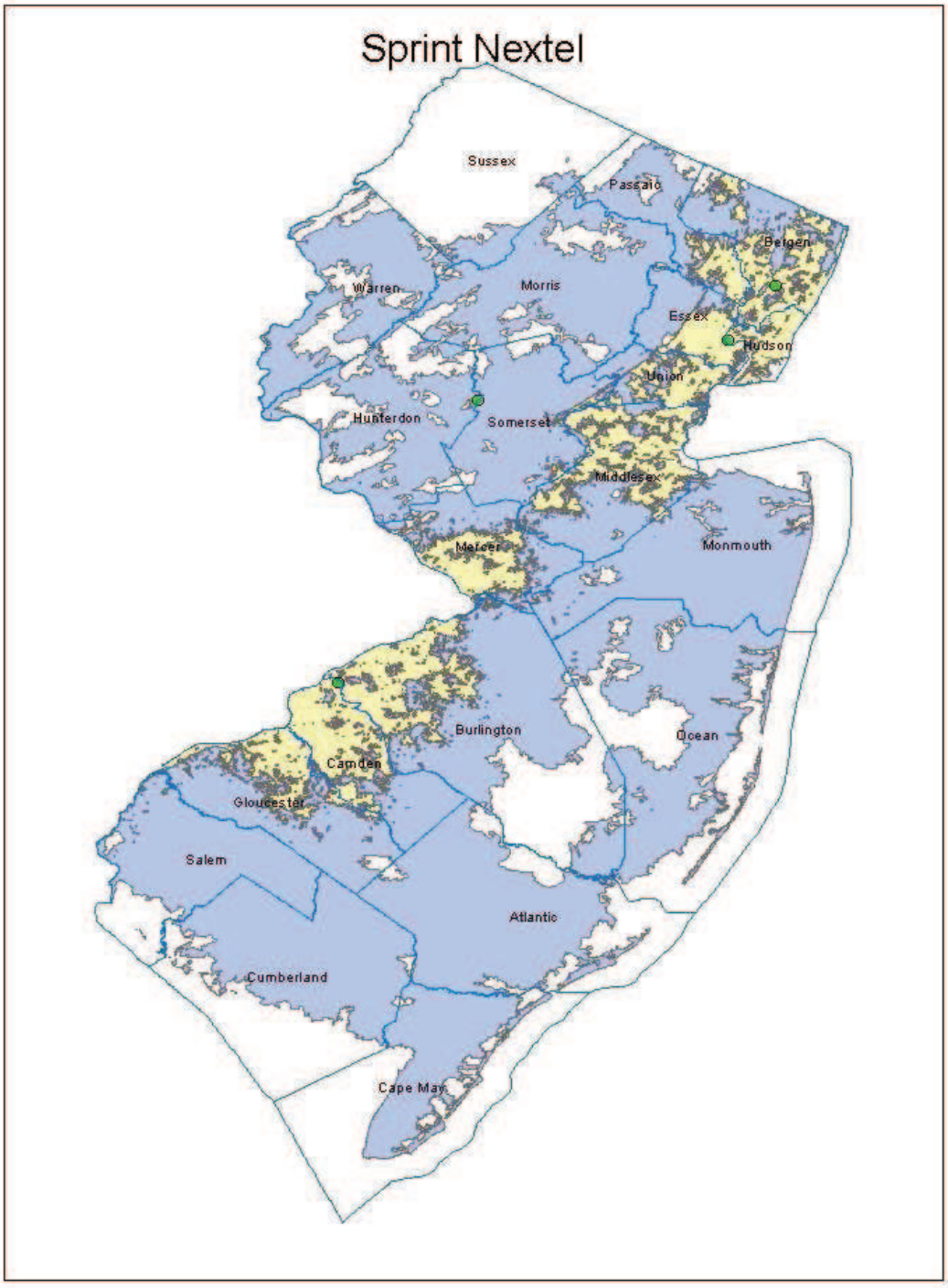
(instead of "6") for the "Serving Facility Capacity" column. Is this intentional?

Sincerely,

Cliff Behrens

Section 7: Notes and Open Issues

Section 8: Overview Map of Submitted Data



Connecting New Jersey - Broadband Provider Data Report

Provider: StarBand Communications Inc.
Received: March 2011
Submission date: April 2013

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

For April 2013:

This is a stub report, since data from the previous submission was reused unchanged. The complete report from the previous submission begins on the next page. Notable differences from the processing done on the previous submission are listed next.

Processing Steps:

11. Although it appears that the shape is inside of the NJ site, we did clip it as this is an important issue to NTIA. Clipped starband_oct2012.BB_Service_Wireless using ESRI: Analysis Tools-> Extract -> Clip with, select feature class refdata_2010.tl_2010_34_state10_wgs. The feature class has the suffix "_Clip".
12. Used ESRI: Data Management Tools->General->Append with NO_TEST schema type to copy starband _oct2012.BB_Service_Wireless_Clip to starband _apr2013.BB_Service_Wireless.

For October 2012:

Total rows loaded: 1 (shape of The State of New Jersey).

Since there is no change in the data and NTIA data model, the table is copied from the 2012 April table, using an ESRI tool, "ArcToolBox->Data Management Tools->General->Append" with NO_TEST in the Schema Type option.

As per the latest clarification, the value in column “SPECTRUM” was set to 9.

For April 2012:

This is a stub report, since data from the previous submission was reused unchanged. The complete report from the previous submission begins on the next page. Notable differences from the processing done on the previous submission are listed next.

For October 2011:

Since there is no change in the data and NTIA data model, the table is copied from the 2011 October table, using an ESRI tool, "ArcToolBox->Data Management Tools->General->Append" with NO_TEST in the Schema Type option.

For April 2011:

Sections:

45. NDA Status
46. Submission Overview
47. Submission File Details
48. Data Validations and Results
49. Data Transformation and Loading
50. Clarification Questions and Provider Responses
51. Notes and Open Issues

Section 1: NDA Status

NONE

Section 2: Submission Overview

<table>
<tr><td colspan="5">AVAILABILITY DATA</td></tr>
<tr><td>ID</td><td colspan="2">Provider name
“Doing business as” name
FRN</td><td colspan="2">StarBand Communications Inc.
Not provided
0005087457</td></tr>
<tr><td colspan="5">FOR WIRELINE</td></tr>
<tr><td>Filetypes</td><td colspan="4"></td></tr>
<tr><td>File size</td><td colspan="4"></td></tr>
<tr><td>Speeds</td><td colspan="3"><table>
<tr><td>Type</td><td></td><td>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)</td></tr>
<tr><td>Typical-upstream</td><td></td><td>Not provided</td></tr>
<tr><td>Typical-downstream</td><td></td><td>Not provided</td></tr>
<tr><td>Advertised-upstream</td><td></td><td></td></tr>
<tr><td>Advertised-downstream</td><td></td><td></td></tr>
<tr><td>Subscriber-weighted-up</td><td></td><td>256Kbps</td></tr>
<tr><td>Subscriber-weighted-down</td><td></td><td>1.5Mbps</td></tr>
</table></td><td>Max advertised up is Code 2 (256 Kbps), down is Code 3 (1.5 Mbps)</td></tr>
<tr><td>Technology</td><td colspan="4">Code 60 (Satellite)</td></tr>
</table>

Type	
End-user specification	Not provided
Comments:	
INTERCONNECTION DATA	
ID	
File size	
Ownership	
Transport Type	
Data Rates/Capacity	
Location	
Comments: Not provided	

Section 3: Submission File Details

Received email explaining their service offering. Satellite service is provided in all of New Jersey.

On subscriber weighted values, they say:
"Since we have only 1 service that meets the definition of broadband service, the weighted average is the same as the average for that service. Upload speed is 256 Kbps and download speed is 1.5Mbps."

Section 4: Validations and Results

No rows of data need to be validated.

Section 5: Data Transformation and Loading

NTIA Table BB_Service_Wireless

Loaded county shapes from reference data for counties in the State of New Jersey based on emailed statements that all counties are covered. The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	Set to "StarBand Communications Inc."

DBANAME	Set to "StarBand"
FRN	Set to 0005087457
TRANSTECH	Set to 60
SPECTRUM	Set to 7 per translation shown below
MAXADDOWN	Set to 4, see below.
MAXADUP	Set to 2, see below.
TYPICDOWN	Not provided, set to null
TYPICUP	Not provided, set to null
STATEABBR	Set to “NJ”
SHAPE	County shape read from reference data.

Internal notes on processing:

19. Spectrum: No statement was provided. The NTIA data model has a single column for spectrum. Satellite corresponds to NTIA “SPECTRUM USED” code value 7.
20. Speeds: The maximum advertised speeds provided in the emailed brochure are as discussed above For max adv speeds we encoded the submitted down speed as value 4 (range 1.5-3 Mbps) and encoded the submitted up speed as value 2 (range 200 Kbps -- 768 Kbps).

Section 6: Clarification Questions and Responses

Subject: RE: NJ Broadband Data Collection - Spring 2013
Date: Tue, 15 Jan 2013 16:04:41 -0500
From: Lesley Cooper - McLean <Lesley.Cooper@spacenet.com>
To: Connecting NJ <ConnectingNJ@appcomsci.com>

Dear Cliff,

This is to advise you that StarBand Communications has no changes to report since our last data submission.

Regards,

Lesley Cooper

Sr. Counsel

StarBand Communications

Subject: RE: NJ Broadband Data Collection - Fall 2012
Date: Tue, 24 Jul 2012 18:14:36 -0400
From: Lesley Cooper - McLean <Lesley.Cooper@spacenet.com>
To: Connecting NJ <ConnectingNJ@appcomsci.com>

Dear Scott,

This is to advise you that StarBand Communications Inc. does not have any changes to report at this time.

Regards,

Lesley Cooper

From: Lesley Cooper - McLean [mailto:Lesley.Cooper@spacenet.com]
Sent: Monday, January 23, 2012 5:42 PM
To: NJ Broadband Data Collection
Subject: RE: NJ Broadband Data Collection - Spring 2012

Dear Sir/Madam:

As of December 31, 2011, StarBand Communications does not have any changes to report.

Regards,

Lesley

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Friday, February 03, 2012 2:05 PM
To: 'Lesley Cooper - McLean'
Cc: NJ Broadband Data Collection
Subject: RE: NJ Broadband Data Collection - Spring 2012

Lesley,
Does Starband have any information on actual coverage areas, taking into account topography, building shadows, etc? Such data, perhaps from modeling and simulations, could improve the accuracy of the coverage map.

John Wullert
Manager - NJ BB Data Collection
Applied Communication Sciences
732-699-2687

From: Lesley Cooper - McLean [mailto:Lesley.Cooper@spacenet.com]
Sent: Tuesday, March 20, 2012 4:58 PM
To: NJ Broadband Data Collection
Subject: RE: NJ Broadband Data Collection - Spring 2012

Dear John,

Sorry for my delay in getting back to you. For each site that StarBand installs, prior to the actual installation our installers will go out to the site and make an assessment as to where the antenna should be placed so that it has adequate line of site.

Hope this helps.

Thanks,

Lesley

1. What is DBA name if different than provider name?

From: NJ Broadband Data Collection [mailto:ConnectingNJ@research.telcordia.com]
Sent: Friday, March 18, 2011 10:51 AM
To: 'Lesley Cooper - McLean'
Cc: 'NJ Broadband Data Collection'
Subject: Starband NJBB CLarification

Lesley,
One quick clarification: we have your provider name as Starband Communications Inc. Do you have any other "doing-business-as" name that we should include in the submission to the NTIA?

John Wullert
Manager – NJ BB Data Collection
Telcordia Technologies
732-699-2687

From: Lesley Cooper - McLean [mailto:Lesley.Cooper@Spacenet.com]
Sent: Tuesday, March 22, 2011 5:48 PM
To: ConnectingNJ@research.telcordia.com
Subject: RE: Starband NJBB CLarification

John,

No, we do not. StarBand is the provider of consumer broadband. StarBand is a part of another company, Spacenet Inc., but Spacenet is not a provider of consumer broadband services.

Please let me know if you have any further questions.

Lesley

From: Lesley Cooper - McLean [mailto:Lesley.Cooper@Spacenet.com]
Sent: Tuesday, July 12, 2011 11:54 AM
To: ConnectingNJ@research.telcordia.com
Subject: RE: NJ Broadband Data Collection

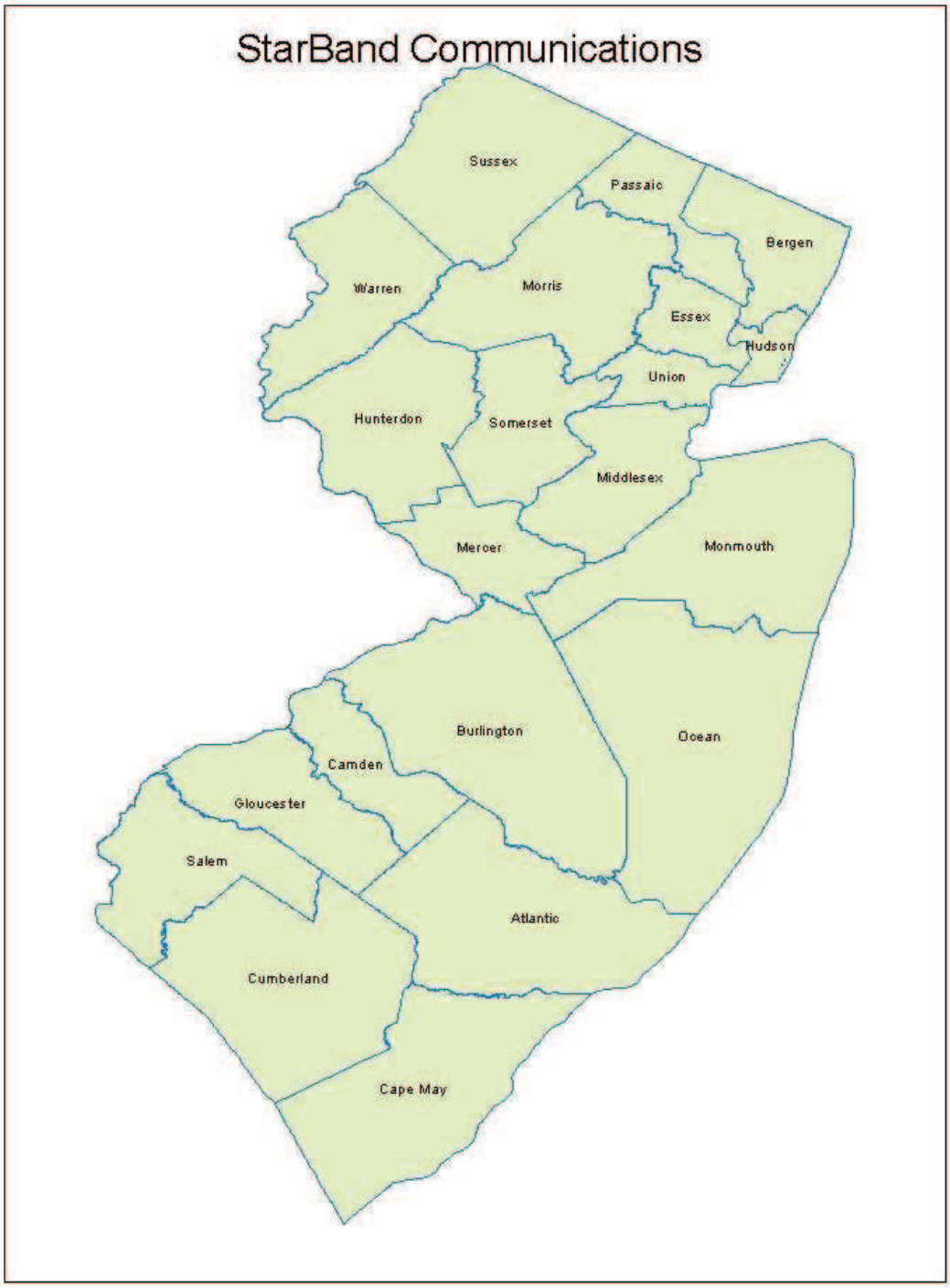
This is to advise you that StarBand Communications does not have any changes to report.

Regards,

Lesley Cooper

Section 7: Notes and Open Issues

Section 8: Overview Map of Submitted Data



Broadband Provider Data Report

Provider: Tata Communications
Received: August 2012
Submission date: April 2013

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

For April 2013:
This is a stub report, since data from the previous submission was reused unchanged. The complete report from the previous submission begins on the next page. Notable differences from the processing done on the previous submission are listed next.

Processing Steps:

13. Used ESRI: Data Management Tools->General->Append with NO_TEST schema type to copy tata_oct2012.BB_Service_CensusBlock to tata_apr2013.BB_Service_CensusBlock.

For October 2012:

Section 1: NDA Status

None

Section 2: Submission Overview

<table>
<tr><th colspan="5">AVAILABILITY DATA</th></tr>
<tr><td>ID</td><td colspan="2">Provider name
“Doing business as” name
FRN</td><td colspan="2">Tata Communications (America) Inc.
Tata Communications (America) Inc.
0009480302</td></tr>
<tr><th colspan="5">FOR WIRELINE</th></tr>
<tr><td>Filetypes</td><td colspan="4">E-mail communications</td></tr>
<tr><td>File size</td><td colspan="4"></td></tr>
<tr><td>Speeds</td><td colspan="2"><table>
<tr><th>Type</th><th></th><th>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)</th></tr>
<tr><td>Typical-upstream</td><td></td><td>Not provided</td></tr>
<tr><td>Typical-downstream</td><td></td><td>Not provided</td></tr>
</table></td><td colspan="2">Received e-mail with address-level information for their only two broadband customers in NJ.</td></tr>
</table>

	Advertised-upstream		Address	
	Advertised-downstream		Address	
	Subscriber-weighted-up		Not provided	
	Subscriber-weighted-down		Not provided	
Technology Type	20 (SDSL)			
End-user specification	None			
Comments:				
INTERCONNECTION DATA				
ID	None provided			
File size				
Ownership				
Transport Type				
Data Rates/Capacity				
Location				
Comments:				

Section 3: Submission File Details

Received e-mail with address-level information for their only two broadband customers in NJ (located in Montvale and Secaucus).

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_Service_CensusBlock

Using information from the e-mail, manually prepared an Excel file "TataBBInfo.xls" which was later geocoded, joined to NJ census blocks and loaded into an SDE table providerInput. Subsequently, the BB_Service_CensusBlock table was loaded from providerInput, with the fields (columns) set as detailed bellow:

Table Column	Data Source / Transformation
PROVNAME	Set to "Tata Communications (America) Inc."
DBANAME	Set to "Tata Communications (America) Inc."

PROVIDER_TYPE	Set to 3, as per the e-mail info
FRN	Set to “0009480302”
STATEFIPS	Set to “34” (NJ)
COUNTYFIPS	Populated from Census Block FIPS Code (digits 2-5)
TRACT	Populated from Census Block FIPS Code (next 6 digits)
BLOCKID	Populated from Census Block FIPS Code
BLOCKSUBGROUP	Set to null
FULLFIPSID	Populated from Census Block FIPS Code
TRANSTECH	Set to 20, as per the e-mail info
MAXADDOWN	Set per records provided in the e-mail.
MAXADUP	Set per records provided in the e-mail.
TYPICDOWN	Set to null, not provided
TYPICUP	Set to null, not provided
SHAPE	Copied from Census Bureau 2010, as matched by spatial join on geocoded address point

.

Section 5: Clarification Questions and Responses

Subject: RE: NJ Broadband Data Collection – Spring 2013- Tata Communications (America) Inc.
Date: Wed, 9 Jan 2013 17:55:06 +0000
From: Diana Peneva <Diana.Peneva@tatacommunications.com>
To: Connecting NJ <ConnectingNJ@appcomsci.com>
CC: ConnectingNJ@appcomsci.com <ConnectingNJ@appcomsci.com>

Dear Cliff,

Tata Communications (America) Inc. (“Tata America”) typically cannot provide broadband services to any customer location in less than 30 days (and it often takes more than 60 days) because it does not own any facilities that connect to customer locations. Because Tata America cannot provide service more quickly without an extraordinary commitment of resources, Tata America’s broadband service is not typically considered “available” to any additional Maryland addresses. Our only two broadband customers continue to be located at:

Tata Beverage Group at 155 Chestnut Ridge Road, Montvale, New Jersey 07645-3Mbps

Tata Global Beverages, Ltd at - 275 Hartz Way, Secaucus, New Jersey 07094 – 1Mbps

Let me know if you need anything further.

Regards,
Diana

Subject: RE: NJ Broadband Data Collection - Fall 2012
Date: Thu, 26 Jul 2012 14:21:16 -0400
From: Diana Peneva <Diana.Peneva@tatacommunications.com>
To: Connecting NJ <ConnectingNJ@appcomsci.com>

Dear Cliff,

Tata Communications (America) Inc.("Tata America") typically cannot provide broadband services to any customer location in less than 30 days (and it often takes more than 60 days) because it does not own any facilities that connect to customer locations. Because Tata America cannot provide service more quickly without an extraordinary commitment of resources, Tata America's broadband service is not typically considered "available" to any additional New Jersey addresses. Our only two broadband customer continue to be located at:

1. 155 Chestnut Ridge Road, Montvale, New Jersey 07645-3Mbps, and

2. 275 Hartz Way, Secaucus, New Jersey 07094 - 1Mbps

Please let me know if you need any additional information.
Kind regards,
Diana

Subject: RE: NJ Broadband Data Collection - Fall 2012
Date: Wed, 5 Sep 2012 15:21:03 +0000
From: Diana Peneva <Diana.Peneva@tatacommunications.com>
To: Connecting NJ <ConnectingNJ@appcomsci.com>

Dear Cliff,

The technology for 155 Chesnut Ridge Road, Montvale, New Jersey 07645-3Mbps was Connect IP Sec.

The technology 275 Hartz Way, Secaucus, New Jersey 07094 - 1Mbps was Connect IP Sec

Please note that we do not have these customers for the period January - June 2012.
Please let me know if you need anything further or require any additional assistance.
Regards,
Diana

Subject: RE: NJ Broadband Data Collection - Fall 2012
Date: Thu, 13 Sep 2012 16:47:05 +0000
From: Angelic Franklin <Angelic.Franklin@tatacommunications.com>
To: Connecting NJ (ConnectingNJ@appcomsci.com)
<ConnectingNJ@appcomsci.com>

Cliff,

We use 20–Symmetric xDSL for those two locations.

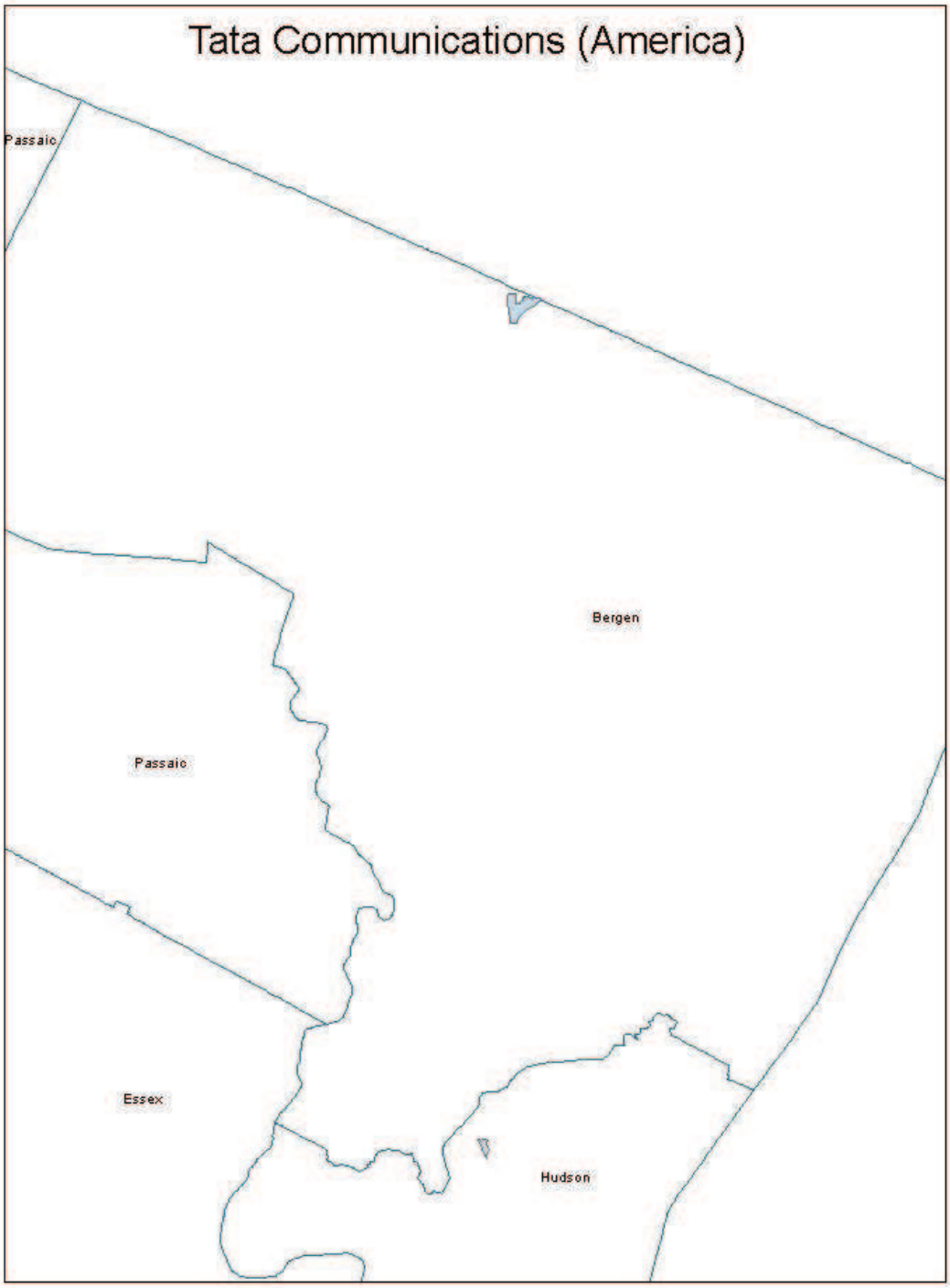
Please confirm receipt.

Angelic Franklin
Paralegal
Legal

Tata Communications (America) Inc.
2355 Dulles Corner Boulevard
Suite 700
Herndon, VA 20171
United States of America

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



Broadband Provider Data Report

Provider: Time Warner
Received: January 2013
Submission date: April 2013

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

NDA established with NJ OIT.

Section 2: Submission Overview

<table>
<tr><th colspan="4">AVAILABILITY DATA</th></tr>
<tr><td rowspan="5">ID</td><td>PROVIDER NAME</td><td colspan="2">Time Warner Cable, LLC</td></tr>
<tr><td>DBA NAME</td><td colspan="2">Time Warner Cable</td></tr>
<tr><td>FRN</td><td colspan="2">0013430244</td></tr>
<tr><td>Holding company name</td><td colspan="2">Time Warner Cable Inc.</td></tr>
<tr><td>Holding company number</td><td colspan="2">131352</td></tr>
<tr><th colspan="4">FOR WIRELINE</th></tr>
<tr><td>File types</td><td colspan="2">Time Warner supplied 1 pdf file and a shapefile showing coverage on FIPS census block level.</td><td></td></tr>
<tr><td>Speeds</td><td colspan="2"><table>
<tr><th>Type</th><th>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode)</th></tr>
<tr><td>Upstream max adv</td><td>yes (code 5). census block.</td></tr>
<tr><td>Downstream max adv</td><td>yes (code 9). census block</td></tr>
<tr><td>Upstream typical</td><td>not provided.</td></tr>
<tr><td>Downstream typical</td><td>not provided</td></tr>
<tr><td>Subscriber-weighted</td><td>not provided</td></tr>
</table></td><td></td></tr>
<tr><td>Technology Type</td><td colspan="2">40</td><td></td></tr>
<tr><td colspan="4">Comments:</td></tr>
<tr><th colspan="4">INTERCONNECTION DATA: INSTRUCTED TO USE PREVIOUS DATA</th></tr>
</table>

ID	
File size	
Ownership	
Transport Type	
Data Rates/Capacity	
Location	
Comments: **not provided** with initial submission. Sent request for updated information.	

Section 3: Submission File Details

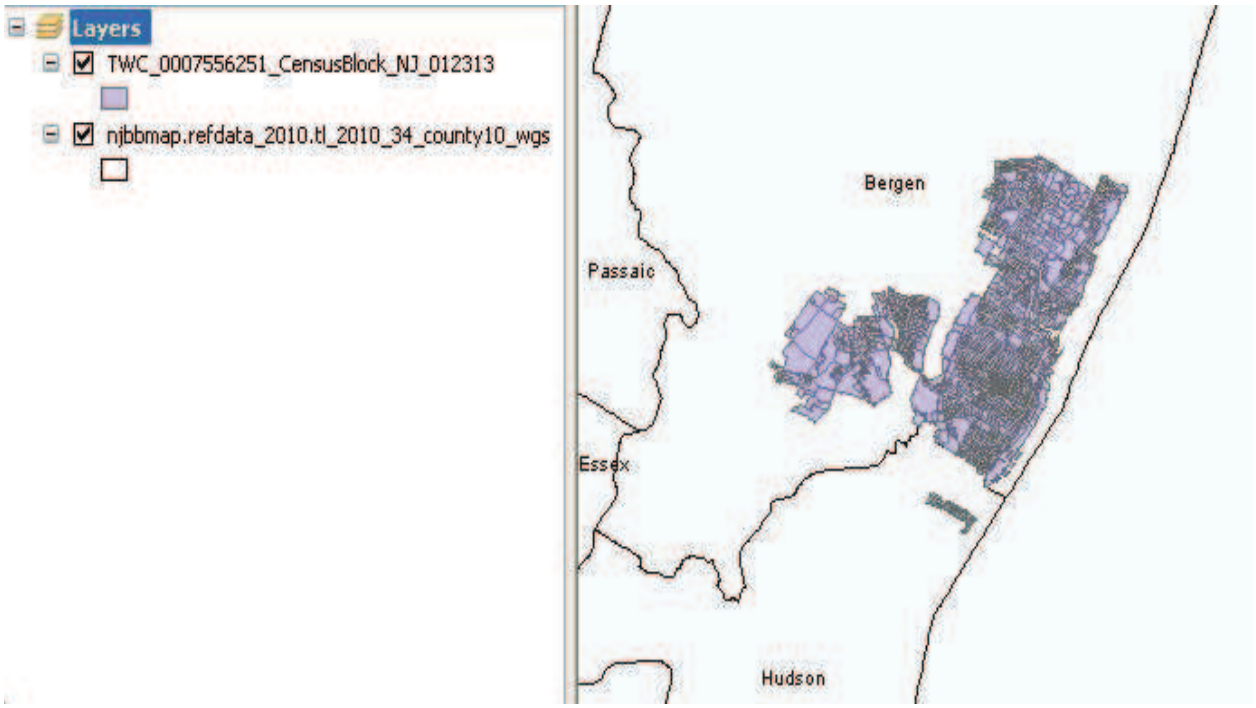
Received 1 archive file by EMAIL:

Name	Size
NJ 7th BB Cltr.pdf	4,212 KB
TWC_0007556251_CensusBlock_NJ_012313.dbf	644 KB
TWC_0007556251_CensusBlock_NJ_012313.prj	1 KB
TWC_0007556251_CensusBlock_NJ_012313.sbn	19 KB
TWC_0007556251_CensusBlock_NJ_012313.sbx	1 KB
TWC_0007556251_CensusBlock_NJ_012313.shp	529 KB
TWC_0007556251_CensusBlock_NJ_012313.shp.xml	2 KB
TWC_0007556251_CensusBlock_NJ_012313.shx	16 KB

Later we have received
0007556251_blendedaverage_NJ_12312012.txt 1KB

Quick loading results: 1973 polygons in shapefile, spanning 2 counties in NJ.

Figure 1. Loaded results



Section 4: Data Validation, Transformation and Loading

NTIA Table BB_ConnectionPoint_MiddleMile

NJ 7th BB Cltr.pdf states that the middle mile data has not been changed. Therefore we copied the 2012 October middle mile data.

The following describes how to create the middle mile data in the 2010 October submission.

Loaded from supplied file "0013430244_middlemile_NJ_06302009.txt" (19 rows, only 1 in New Jersey) received in **June 2010** (and apparently unchanged since). The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	Set to "Time Warner Cable LLC" ("LLC" was missing)
DBANAME	As supplied in column "DBAName"
FRN	Set to "0013430244"
OWNERSHIP	As supplied in column "Ownership"
BHCAPACITY	As supplied in column "Serving Facility Capacity"
BHTYPE	As supplied in column "Serving Facility Type"
LATITUDE	As supplied in column "Latitude"
LONGITUDE	As supplied in column "Longitude"
ELEVFEET	As supplied in column "Elevation"
STATEABBR	Set to "NJ"
FULLFIPSID	ID of containing census block from Year 2010 Census Bureau reference data
SHAPE	Point corresponding to Lat, Long created using ESRI

Internal processing notes from prior report:

13. Created an excel sheet and imported to a geodatabase table.
14. Added points corresponding to each Latitude,Longitude pair by creating a feature class from the table using ArcCatalog's "Create Feature Class from XY Table" option.
15. We dropped all locations outside the New Jersey state boundary, leaving just one. In this row, the elevation value is 30, and we were told in June 2010 that the connection point is on the 7th floor of a building, so we did not change the value.
16. Added a column with the ID of the containing Year 2000 Census block via a

spatial join of the points and the census block shapes from reference data.

NTIA Table BB_Service_CensusBlock

The census block information was loaded from the supplied shape file. The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	Set to “Time Warner Cable LLC” (“LLC” was missing in submitted data)
DBANAME	As supplied in column ”DBAName”
PROVIDER_TYPE	Set to 1
FRN	Set to “0013430244”
STATEFIPS	Set to “34”
COUNTYFIPS	Populated from cb_fips (digits 3-5)
TRACT	Populated from cb_fips (next 6 digits)
BLOCKID	Populated from cb_fips (next 4 digits)
FULLFIPSID	As supplied in column cb_fips
TRANSTECH	As supplied in column tech_trans
MAXADDOWN	As supplied in column max_ad_dwn
MAXADUP	As supplied in column max_ad_up
TYPICDOWN	Submitted as “0” in provided data, set to null
TYPICUP	Submitted as “0” in provided data, set to null
ENDUSERCAT	Not provided, set to null
SHAPE	As supplied

Internal notes on processing

1. The shapefile TWC_007556251_CensusBlock_NJ_012313 contains 1973 rows (polygons). See above for a preview picture.
2. The shapes use XY coordinate system GCS_North_American_1983. Provides census-block shapes and associated speed data. All census block IDs are length 15. All submitted block IDs are unique and were found in Census Bureau Year 2010 reference data. Only technology code 40 is present. Maximum advertised speed codes are present.
3. Geographic coordinate system: The supplied shape uses geographic coordinate system name GCS_North_American_1983. The NTIA transmittal data model requires coordinate system GCS_WGS_1984. To change the projection we applied the geographic transformation NAD_1983_To_WGS_1984_5 (per ESRI KB article 24159). We also had to load the data into a second feature class such that the tolerance value matches the NTIA transmittal model’s value of 0.000000002. The table has the suffix “_wgs_tol”.
4. Checked that all census blocks were valid NJ blocks and that no duplicates were present.

NTIA Table BB_Service_Overview

The following data were submitted in 0007556251_blendedaverage_NJ_12312012.txt. However, the service provider stated that the data are proprietary, not for public consumption or dissemination in any form.
Since we are not sure if the BB_Service_Overview table has proper protection, we did not to submit the data.

```
NAME  DBA   FRN   COUNTY      STATE TECH CODE   SWNOMSPEED
Time Warner Cable Inc.   Time Warner Cable       0007556251        003   34   40
       8,364.4
Time Warner Cable Inc.   Time Warner Cable       0007556251        017   34   40
       7,301.0
```

Section 5: Clarification Questions and Responses

Subject: FW: NJ State Broadband Mapping Program - 7th Round
Date: Wed, 20 Mar 2013 01:18:47 +0000
From: Sandy Nye <Sandy.Nye@northhighland.com>
To: Cliff Behrens (cbehrens@appcomsci.com) (cbehrens@appcomsci.com) <cbehrens@appcomsci.com>
CC: Diane Duffy (dduffy@appcomsci.com) <dduffy@appcomsci.com>, Scott Kloss <Scott.Kloss@northhighland.com>, Rania Kort <RANIA.KORT@northhighland.com>

Hi Cliff,

See attached (and below) for Time Warner Cable data to be added to the master inventory for this round of data submission.

Let me know if you have any questions or need additional support on this.

Thx,
Sandy

SANDY NYE, PMP

northhighland
103 Carnegie Center Suite 300 | Princeton, NJ 08540
C: 610.505.2126

#1 Best Place to Work in New Jersey, NJ Biz

Facebook | LinkedIn | Twitter

From: Kloss, Scott [mailto:Scott.Kloss@oit.state.nj.us]
Sent: Monday, March 18, 2013 1:13 PM
To: Sandy Nye
Subject: FW: NJ State Broadband Mapping Program - 7th Round

From: Bates, Shelley
Sent: Monday, March 18, 2013 1:11 PM
To: Kloss, Scott
Subject: FW: NJ State Broadband Mapping Program - 7th Round

From: Crawford, Monique [mailto:monique.crawford@twcable.com]
Sent: Monday, March 18, 2013 12:48 PM
To: Bates, Shelley
Cc: Crawford, Monique
Subject: RE: NJ State Broadband Mapping Program - 7th Round

Hello Shelley:

Attached is the Time Warner Cable Confidential Subscriber-Weighted Nominal Speed data showing the blended average of our advertised maximum broadband download speeds as of December 31, 2012. This information is highly Confidential and is protected under the confidentiality requirements set forth in Section 106 (h) of the Broadband Data Improvement Act and the Nondisclosure Agreement. The information is not for public disclosure.

If you have any questions regarding this submission please let me know.

Best regards,

Monique R. Crawford
Regulatory Affairs
Time Warner Cable
13820 Sunrise Valley Dr.
Herndon, VA 20171

(703) 345-3175 Office
(703) 554-5019 Mobile
(704) 697-4933 E-fax

From: Bates, Shelley [mailto:Shelley.Bates@oit.state.nj.us]
Sent: Monday, January 28, 2013 2:07 PM
To: Crawford, Monique
Subject: RE: NJ State Broadband Mapping Program - 7th Round

Thanks Monique. We will contact you if we have questions.

Happy Belated New Year!

From: Crawford, Monique [mailto:monique.crawford@twcable.com]
Sent: Monday, January 28, 2013 2:06 PM
To: Bates, Shelley
Cc: Crawford, Monique
Subject: NJ State Broadband Mapping Program - 7th Round

Hello Shelly:

Attached is Time Warner Cable's 7th round broadband mapping submission. Please let me know if you have any questions or concerns.

Best regards,

Monique R. Crawford
Regulatory Affairs
Time Warner Cable
13820 Sunrise Valley Dr.
Herndon, VA 20171

(703) 345-3175 Office
(703) 554-5019 Mobile
(704) 697-4933 E-fax

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Monday, February 27, 2012 10:26 AM
To: 'monique.crawford@twcable.com'
Cc: 'NJ Broadband Data Collection'
Subject: NJ Braodband Clarification

Monique,

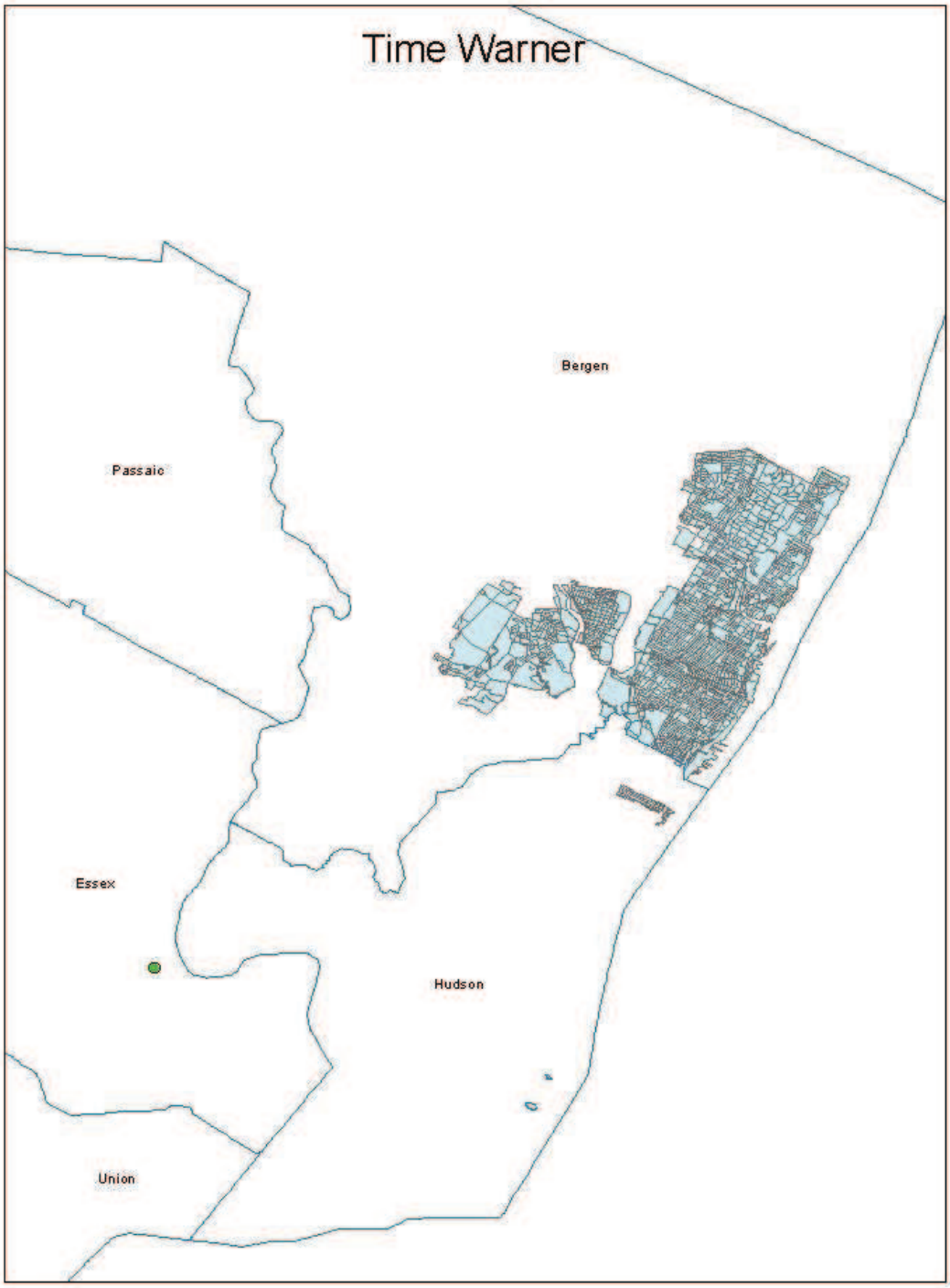
We have begun reviewing your latest broadband availability data and noticed that this round you did not include any information on middle mile. Do you have updated middle mile information or should we use the data you submitted in the previous round?

Thanks,

John Wullert
Manager - NJ BB Data Collection
Applied Communication Sciences
732-699-2687

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



Connecting New Jersey - Broadband Provider Data Report

Provider: T-Mobile
Received: January 2013
Submission date: April 2013

This report presents details on processing broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

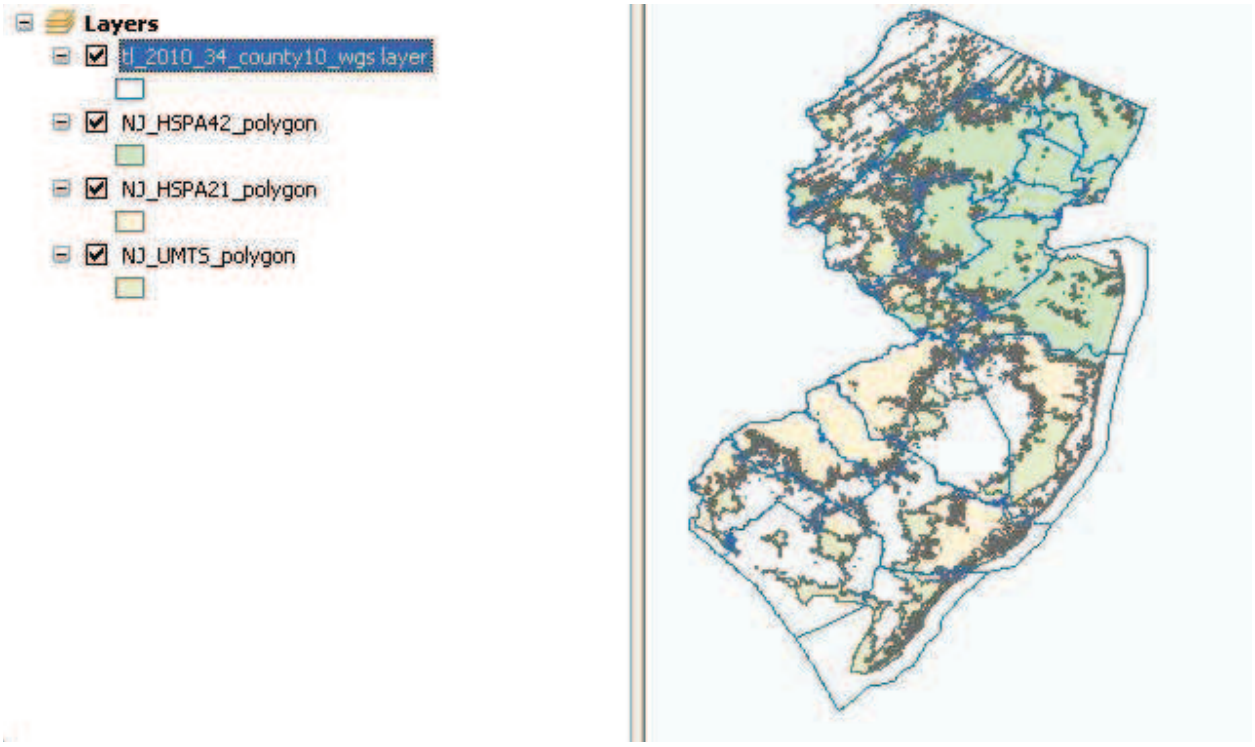
Executed with NJ OIT.

Section 2: Submission Overview

<table>
<tr><th colspan="4">AVAILABILITY DATA</th></tr>
<tr><td>ID</td><td colspan="2">PROVIDER NAME
DBA NAME
FRN
Holding company name
Holding company number</td><td>T-Mobile USA, Inc.
T-Mobile
0006945950
T-Mobile USA
130403</td></tr>
<tr><th colspan="4">FOR WIRELESS</th></tr>
<tr><td>Filetypes</td><td colspan="2">T-mobile supplies .xls, .txt. and shapefiles (availability). They supply 3 sets of shape files: 2 for HSPA+ coverage and another for 3G coverage.</td><td></td></tr>
<tr><td>Speeds</td><td colspan="2"><table><tr><td>Type</td><td>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode)</td></tr><tr><td>Upstream max adv</td><td>yes (shapefiles for both 3G and 4G)</td></tr><tr><td>Downstream max adv</td><td>yes (shapefiles for both 3G and 4G)</td></tr><tr><td>Upstream typical</td><td>not found.</td></tr><tr><td>Downstream typical</td><td>not found.</td></tr><tr><td>Subscriber-weighted</td><td>Provided as a table of values in mbps (not kbps) correlated to 21 FIPS codes (code 80)</td></tr></table></td><td>Notes: “T-Mobile submitted three sets of map files for this state. The file names correspond with maximum advertised speed data above. HSPA42 represents increased 4G download speed (it does not affect upload speed).”</td></tr>
<tr><td>Technology Type</td><td colspan="2">Spectrum (Mhz, FCC code)</td><td>Advanced Wireless Services spectrum (1710-1755 MHz; 2100-2155)</td></tr>
<tr><td colspan="4">Comments:</td></tr>
</table>

INTERCONNECTION DATA	
ID	
File size	10 rows
Ownership	Code 1
Transport Type	Type 1
Data Rates/Capacity	codes 4 and 6
Location	lat/longs given for all (either A or Z end is in NJ)
Comments: T-Mobile had reported with their submission that this information would be delayed	

Figure 1. Preview of submitted data in ESRI



Section 3: Submission File Details

The original submission includes the following files:

Name	Size
area_availability_NJ.txt	4 KB
area_availability_NJ.zip	3,299 KB
avg_speed_NJ.xlsx	12 KB
confidential_NJ.txt	1 KB
Cover Letter_NJ.pdf	23 KB
NJ_HSPA21_polygon.dbf	1 KB
NJ_HSPA21_polygon.prj	1 KB
NJ_HSPA21_polygon.shp	4,124 KB
NJ_HSPA21_polygon.shx	1 KB
NJ_HSPA42_polygon.dbf	1 KB
NJ_HSPA42_polygon.prj	1 KB
NJ_HSPA42_polygon.shp	1,814 KB
NJ_HSPA42_polygon.shx	1 KB
NJ_UMTS_polygon.dbf	1 KB
NJ_UMTS_polygon.prj	1 KB
NJ_UMTS_polygon.shp	5,426 KB
NJ_UMTS_polygon.shx	1 KB
T-Mobile_BB Data_NJ.zip	3,326 KB

The second submission on 2/12/2013 includes middle mile data. But it is the same as the last submission.

Name	Size
middle-mile_NJ.xlsx	10KB

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_ConnectionPoint_MiddleMile

The Middlemile data is the same as the last submission. Copy tmobile_oct2012.BB_ConnectionPoint_MiddleMile to tmobile_apr2013.BB_ConnectionPoint_MiddleMile using ESRI: Data Management Tools->General->Append with NO_TEST schema type.

Below is description of the Oct 2012 data.
Loaded from supplied file “middle_mile_NJ.xlsx” (8 rows). The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	Set to “T-Mobile USA, Inc."
DBANAME	Set to "T-Mobile"
FRN	Set to “0006945950”

OWNERSHIP	As provided in column Ownership (value 1)l
BHCAPACITY	As provided in column Serving Facility Capacity
BHTYPE	As provided in column Serving Facility Type
LATITUDE	Created by geocoding the supplied address
LONGITUDE	Created by geocoding the supplied address
ELEVFEET	Set to “0” (zero)
STATEABBR	As provided in column State
FULLFIPSID	ID of containing census block from Year 2010 Census Bureau reference data
SHAPE	Point created using ESRI tools

Internal notes on processing:

17. Created an excel sheet with the original data, remove the first 3 header lines, add the Latitude and Longitude columns, copied the NJ lat/long from the A or Z lat/long to the Latitude and Longitude columns, and imported to a geo-database table. (If A and Z are all NJ, copy Z which is arbitrarily chosen.)
18. Added points corresponding to each Latitude, Longitude pair by creating a feature class from the table using ArcCatalog’s “Create Feature Class from XY Table” option.
19. Added a column containing the ID of the containing year 2010 census block via a spatial join of the points and the Year 2010 census block shapes from Tiger Line reference data. Ensured that all entries were successfully mapped to 2010 census blocks.
20. Dropped 4 records that were as duplicate census blocks
21. Loaded 4 records.

NTIA Table BB_Service_Wireless

Loaded from the supplied shapefiles NJ_HSPA21_polygon (1 rows), NJ_HSPA42_polygon (1 rows), and NJ_UMTS_polygon (1 rows). The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	Set to "T-Mobile USA, Inc." per area_availability_NJ.txt
DBANAME	Set to “T-Mobile" per area_availability_NJ.txt
FRN	Set to “0006945950”
TRANSTECH	Set to 80 per area_availability_NJ.txt
SPECTRUM	Set to “4” per translation shown below
MAXADDOWN	Set as follows: • HSPA 21 is 6; • HSPA 42 is 7; • UMTS is 4; as specified in file area_availability_NJ.txt
MAXADUP	Set as follows: • HSPA 21 is 4;

	• HSPA 42 is 4; • UMTS is 2; as specified in file area_availability_NJ.txt
TYPICDOWN	Set to as follows: • HSPA 21 is 5; • HSPA 42 is 6; • UMTS is 2; as specified in file area_availability_NJ.txt
TYPICUP	Set to as follows: • HSPA 21 is 3; • HSPA 42 is 3; • UMTS is 1; as specified in file area_availability_NJ.txt
STATEABBR	As supplied in column “state” with “NJ”
SHAPE	As supplied.

Internal notes on processing:

21. Received three shape files; see above for preview of shapefiles in ESRI. (Note that we do not check duplicate since the shapes will be merged to a single shape for each technology) Different from last submissions where NJ_HSPA21 has 5944 records, NJ_HSPA4 has 3171 records, and NJ_UMTS has 2286 records, this submission has only one record per each.
    a. NJ_HSPA21
        i. 1 candidates
    b. NJ_HSPA42
        i. 1 candidates
    c. NJ_UMTS
        i. 1 candidates
22. The data rows carry no technology, speed, or other broadband data. This data is provided in a separate file. File “area_availability_NJ.txt” provides technology and spectrum codes that are within the valid set. It also provides maximum-advertised speeds for each wireless technology.
23. File “avg_speed_NJ.xls” provides subscriber-weighted nominal speeds, which we will not be using for this round (no overview table required).
24. Spectrum: NOFA defines 7 spectrum columns. T-Mobile provided a “Y” value in column 4 (Advanced Wireless Services, ranges 1710-1755 MHz; 2100-2155) in file area-availability_NJ.txt, so we coded the value as '4'.
25. The supplied shapes use Z coordinate. We need to remove it using ArcToolbox > Conversion Tools > To Geodatabase-> Feature Class to Geodatabase (multiple) tool. The resulting tables are named with suffix “_z”.

http://support.esri.com/en/knowledgebase/techarticles/detail/35818

Procedure

1. Browse to ArcToolbox > Conversion Tools > To Geodatabase.

2. Open the Feature Class to Geodatabase (multiple) tool.
3. Add all the feature classes into the Input Feature Class parameter.
4. Select an Output Geodatabase.
5. Click the Environments button at the bottom of the tool dialog box.
6. Expand the General Settings.
7. For the parameter, Output has Z Values, change the value to Disabled.
8. For the parameter, Output has M Values, change the value to Disabled.
9. Click OK in the Environments dialog box.
10. Click OK to execute the geoprocessing tool

26. The supplied shapes use geographic coordinate system GCS_North_American_1983. The NTIA data model requires coordinate system GCS_WGS_1984. To change the projection we applied the ESRI geographic transformation NAD_1983_To_WGS_1984_5 (per ESRI KB article 24159). The resulting tables are named with suffix "_wgs".
27. The supplied shapes use tolerance values different from the NTIA transmittal model. The transformed feature classes with suitable tolerances are named with suffix "_tol".
28. NTIA requires shapes to be contained in the NJ state boundary. Although we can visually verified that it is the case, we clipped the shape using ESRI: Analysis Tools-> Extract -> Clip with, select feature class refdata_2010.tl_2010_34_state10_wgs. The feature class has the suffix "_clip".
29. Note that this is NOT required as only one record is submitted per each type. The NJ_HSPA42 and NJ_UMTS shapefiles contained some identical rows as determined by spectrum, technology, and shape; the rows only differed in the maximum advertised speed. To prevent the problem of duplicate shapes in the merged data, we took the following actions:
    a. Merged shapes in NJ_HSPA21_polygon_wgs_tol_clip into a single shape, using ArcGIS Dissolve tool: Data Management Tools->Generalization->Dissolve (without choosing anything in the Dissolve_Field(s) option). The transformed table is named with suffix "_z_wgs_tol_clip_Dissolve".
    b. Merged shapes in NJ_HSPA42_polygon_wgs_tol_clip into a single shape, using ArcGIS Dissolve tool. The transformed table is named with suffix "_z_wgs_tol_clip_Dissolve".
    c. Merged the shapes in NJ_UMTS_polygon_wgs_tol_clip into a single shape, using ArcGIS Dissolve tool. The transformed table is named with suffix "_z_wgs_tol_clip_Dissolve".
30. Validation rules produced a warning with the HSPA42 having a Maximum Advertised Download Speed code of 7(10-25 Mbps). Investigation of the T-Mobile Web site showed that they are advertising average speeds "approaching

10 Mbps" and peak speeds of 27 Mbps. Sent a note to the provider to verify the value. Provider confirmed that those values are correct.

Section 5: Clarification Questions and Responses

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Tuesday, February 28, 2012 8:21 AM
To: 'jeni.wilcox@t-mobile.com'
Cc: 'NJ Broadband Data Collection'
Subject: NJ Broadband Clarification

Jeni,
As part of the validation of the Broadband Data, the NTIA has defined a set of speed ranges associated with various technologies and asked us to verify any submission values outside those ranges. In the case of the T-Mobile data, the value of 7 (10 to 25 Mbps) associated with download on HSPA42 is outside the NTIA's expected range. Can you please confirm that you are reporting download speeds of greater than or equal to 10 Mbps and less than 25 Mbps?

Thanks,

John Wullert
Manager - NJ BB Data Collection
Applied Communication Sciences
732-699-2687

From: Wilcox, Jeni [mailto:Jeni.Santana@t-mobile.com]
Sent: Tuesday, March 20, 2012 12:41 PM
To: NJ Broadband Data Collection
Subject: RE: NJ Broadband Clarification

Hi John,

Sorry, this one slipped by me. Yes, T-Mobile is reporting **≥ 10 mbps < 25 mbps** as the maximum advertised download speed for its HSPA+42 network.

Thank you,

Jeni Wilcox
Senior Specialist, State Regulatory Affairs

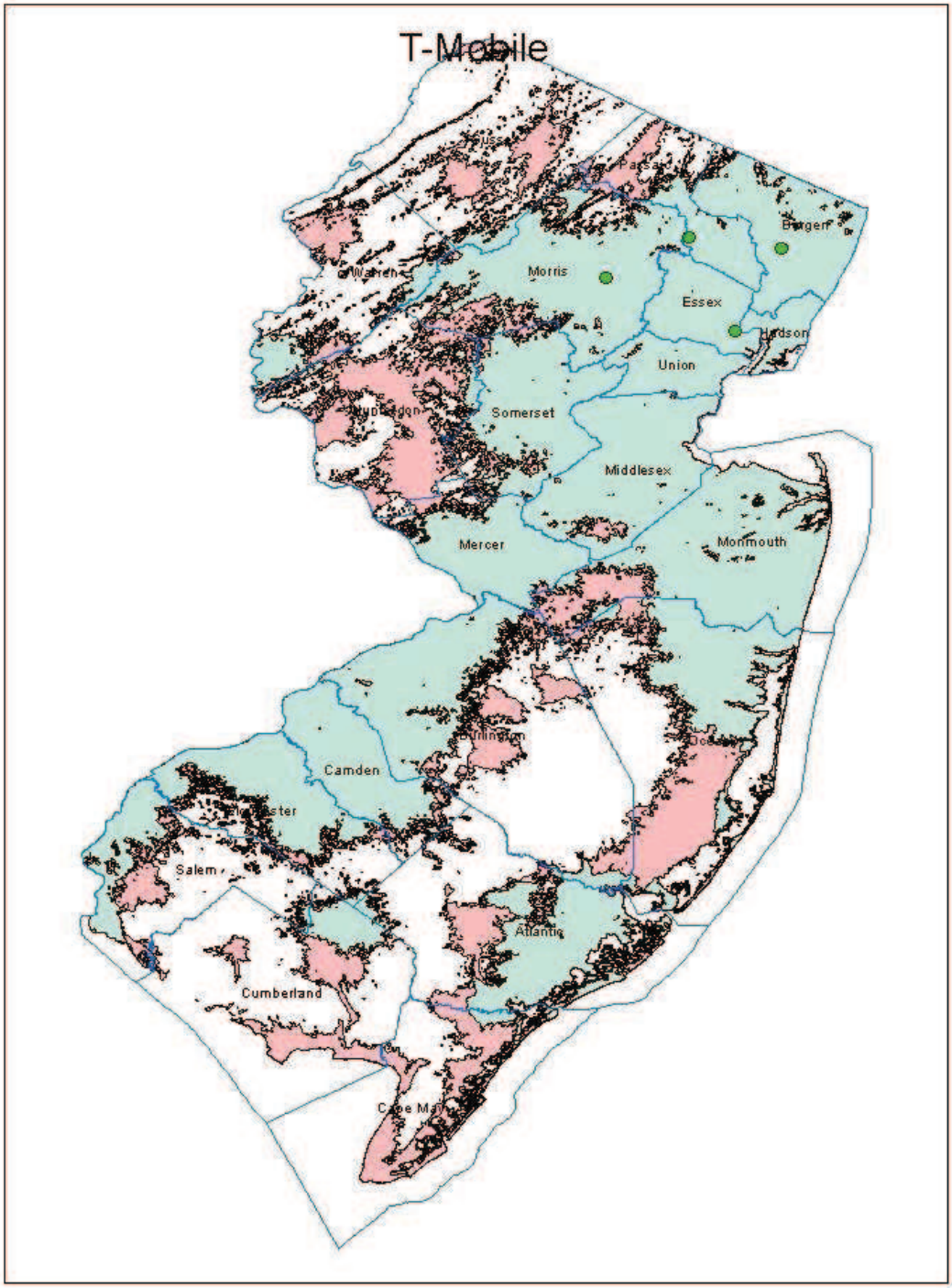
Section 6: Notes and Open Issues

This provider has given us three sets of shapes, one for "HSPA21", one for "HSPA42" and one for "UMTS". All are submitted to us as technology code 80 and all in spectrum code 4. But they have different speeds. The validations complain about duplicate rows,

based on the shape column and the technology code. Here it seems the technology and spectrum codes do not adequately capture what we have received from the provider.

We solved the problem by using the ArcGIS “Dissolve” tool to merge all the polygons in each submitted feature class into a single polygon. The submission has exactly three rows, one shape for each speed tier, and is not flagged as duplicates.

Section 7: Overview Map of Submitted Data



Connecting New Jersey - Broadband Provider Data Report

Provider: tw telecom of new jersey l.p.
Received: February 2013
Submission date: April 2013

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

NONE

Section 2: Submission Overview

<table>
<tr><th colspan="4">AVAILABILITY DATA</th></tr>
<tr><td>ID</td><td colspan="2">Provider name
“Doing business as” name
FRN
Holding company name
Holding company number</td><td>tw telecom of new jersey l.p.
Not provided
0004351417
tw telecom inc.
160153</td></tr>
<tr><th colspan="4">FOR WIRELINE</th></tr>
<tr><td>Filetypes</td><td colspan="3">Text</td></tr>
<tr><td>File size</td><td colspan="3">4329 bytes, 45 records</td></tr>
<tr><td>Speeds</td><td colspan="3"><table>
<tr><th>Type</th><th></th><th>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)</th></tr>
<tr><td>Typical-upstream</td><td></td><td>Not provided</td></tr>
<tr><td>Typical-downstream</td><td></td><td>Not provided</td></tr>
<tr><td>Advertised-upstream</td><td></td><td>Address; values 2..11</td></tr>
<tr><td>Advertised-downstream</td><td></td><td>Address; values 2..11</td></tr>
<tr><td>Subscriber-weighted-up</td><td></td><td>Not provided</td></tr>
<tr><td>Subscriber-weighted-down</td><td></td><td>Not provided</td></tr>
</table></td></tr>
<tr><td>Technology Type</td><td colspan="3">30 (Other copper) and 50 (fiber)</td></tr>
<tr><td>End-user specification</td><td colspan="3">4 (medium – large enterprise) in all cases</td></tr>
</table>

Comments:	
INTERCONNECTION DATA	
ID	
File size	
Ownership	
Transport Type	
Data Rates/Capacity	
Location	
Comments: None provided	

Section 3: Submission File Details

Received 1 file by secure upload:

Size	Name
4329	NJBB_0004351417_AddressLevelAvailability.txt

The file has 45 records. All are addresses; no apartment/suite/unit numbers are provided. Some addresses are repeated, sometimes with different speed numbers, suggesting that these entries are customer service addresses. Several are the addresses of multi-tenant buildings. Technology code 30 is present with symmetric speeds, codes range from 4 to 7. Technology code 50 is present with symmetric speeds; codes range from 4 to 11. This is a result of the provider collecting information about the services subscribed to by current customers at these addresses.

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_Service_CensusBlock

Loaded from supplied file “NJBB_0004351417_AddressLevelAvailability.txt”. The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	As supplied in column “Provider Name”, but removed “l.p.” from the end of the address.
DBANAME	Not supplied; set same as PROVNAME
PROVIDER_TYPE	Set to 1
FRN	As supplied in column “FRN”, with leading zeroes appended

STATEFIPS	Set to “34” (NJ)
COUNTYFIPS	Populated from Census Block FIPS Code (digits 3-5)
TRACT	Populated from Census Block FIPS Code (next 6 digits)
BLOCKID	Populated from Census Block FIPS Code (next 5 digits)
BLOCKSUBGROUP	Set to null
FULLFIPSID	Populated from Census Block FIPS Code
TRANSTECH	As supplied in column Technology of Transmission
MAXADDOWN	For technology 30: Set to 7, the max val in MaxAdDown For technology 50: Set to 11, the max val in MaxAdDown
MAXADUP	For technology 30: Set to 7, the max val in MaxAdDown For technology 50: Set to 11, the max val in MaxAdDown
TYPICDOWN	Set to null, not provided
TYPICUP	Set to null, not provided
SHAPE	Copied from Census Bureau TigerLine 2000, as matched by spatial join on geocoded address

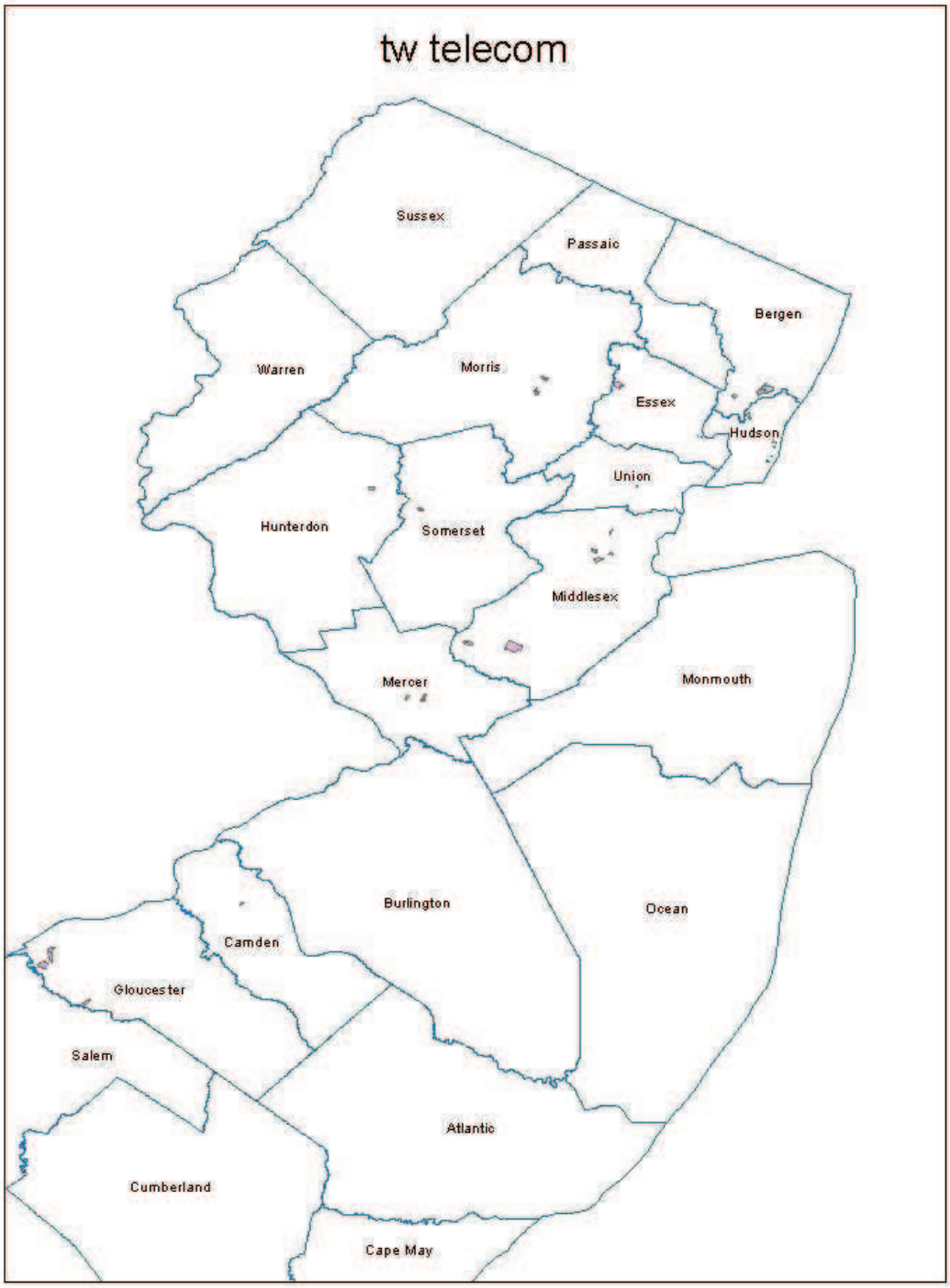
Internal processing notes:

22. Geocoded the addresses using the Google geocoder to obtain a Latitude, Longitude pair for each.
23. Created an excel sheet and imported it to a geodatabase table.
24. Added point shapes corresponding to each Latitude, Longitude pair by creating a feature class from the table using ArcCatalog’s “Create Feature Class from XY Table” option.
25. Added a column containing the ID of the containing year 2010 census block via a spatial join of the point shapes and the census block shapes from reference data. All addresses were successfully joined with a census block.
26. Discarded 17 rows with duplicate census blocks, generated from the multiple entries at the same addresses
27. Verified that all census blocks were in New Jersey and that no census block was greater than 2 square miles
28. Loaded 28 records into the transfer model table.

Section 5: Clarification Questions and Responses

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



Broadband Provider Data Report

Provider: Verizon
Received: January 2013
Submission date: April 2013

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

Verizon executed an NDA with NJ OIT.

Section 2: Submission Overview

<table>
<tr><th colspan="3">AVAILABILITY DATA</th></tr>
<tr><td rowspan="5">ID</td><td>Provider name
“Doing business as” name
FRN
Holding company name
Holding company number</td><td>Verizon Online LLC
Verizon
0012254363
Verizon Communications Inc.
131425</td></tr>
<tr><th colspan="3">FOR WIRELINE</th></tr>
<tr><td>Filetypes</td><td colspan="2">Text and excel</td></tr>
<tr><td>File size</td><td colspan="2">See below</td></tr>
<tr><td>Speeds</td><td colspan="2"><table>
<tr><th>Type</th><th></th><th>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode, etc)</th></tr>
<tr><td>Typical-upstream</td><td></td><td>Not provided</td></tr>
<tr><td>Typical-downstream</td><td></td><td>Not provided</td></tr>
<tr><td>Advertised-upstream</td><td></td><td>Census Block</td></tr>
<tr><td>Advertised-downstream</td><td></td><td>Census Block</td></tr>
<tr><td>Subscriber-weighted-up</td><td></td><td>Not provided</td></tr>
<tr><td>Subscriber-weighted-down</td><td></td><td>Not provided</td></tr>
</table></td></tr>
<tr><td>Technology Type</td><td colspan="2">DSL (10) and FTTP (50)</td></tr>
<tr><td>End-user specification</td><td colspan="2">Not provided</td></tr>
<tr><td colspan="3">Comments:</td></tr>
</table>

INTERCONNECTION DATA	
ID	
File size	Excel file, 3 POP rows provided, see below
Ownership	Specified in cover letter as being owned by Verizon's affiliate, MCI Communications Services, Inc.
Transport Type	Not provided
Data Rates/Capacity	Not provided
Location	Address
Comments: Sent email to Verizon requesting additional information on Middle Mile points.	

Section 3: Submission File Details

Received these files via email, sent to Scott Kloss in an encrypted zip archive.

Name	Size
NJ - Broadband Data Cover Letter (1-29-13).pdf	123 KB
NJ - POP List (Dec 2012).pdf	32 KB
NJ - Pricing (Dec 2012).txt	3 KB
NJ - Wireline Service By Census Block with Speeds (Dec 2012).txt	6,485 KB
NJ - Wireline Service By Street Segment with Speeds (Dec 2012).txt	138 KB
VZ-NJ-BB (Dec 2012).zip	1,134 KB

Section 4: Data Validation Transformation and Loading

NTIA Table BB_ConnectionPoint_MiddleMile

Loaded from supplied text file "NJ – POP List (Dec 2012).pdf".
The following table explains the transformations that were applied in this submission.

Table Column	Data Source / Transformation
PROVNAME	Set to "Verizon Online LLC""
DBANAME	Set to "Verizon"
FRN	Set to "0012254363"
OWNERSHIP	Set to 0, owned, based on cover letter information
BHCAPACITY	Set to null
BHTYPE	Set to null
LATITUDE	Created by geocoding the supplied addresses
LONGITUDE	Created by geocoding the supplied addresses
ELEVFEET	Set to "0" (zero)

STATEABBR	Set to “NJ”
FULLFIPSID	ID of containing census block from Year 2010 Census Bureau TigerLine reference data
SHAPE	Created using ESRI ArcDesktop

Internal notes on processing:

29. We geocoded the addresses to obtain latitude, longitude value pairs. Both addresses were found. Verizon did not supply information on the elevation, serving facility capacity, and service facility type of these addresses. Sent request to Verizon regarding this information.
30. Created an excel sheet and imported to a geodatabase table.
31. Added points corresponding to each Latitude,Longitude pair by creating a feature class from the table using ArcCatalog’s “Create Feature Class from XY Table” option.
32. Added a column containing the ID of the containing year 2010 census block via a spatial join of the points and the census block shapes from reference data. The table name is verizon_middlemile_wgs_tol_cb.

NTIA Table BB_Service_CensusBlock

Loaded from supplied text file “NJ - Wireline Service By Census Block with Speeds (Dec 2012).txt”. The following table explains the transformations that were applied to load the target table.

Table Column	**Data Source / Transformation**
PROVNAME	Set to “Verizon Online LLC”
DBANAME	Set to “Verizon”
PROVIDER_TYPE	Set to 1
FRN	Set to “0012254363”
STATEFIPS	Set to “34” (NJ)
COUNTYFIPS	Populated from 2010_Census_Block_FIPS_Code (Digits 3-5)
TRACT	Populated from 2010_Census_Block_FIPS_Code (next 6 digits)
BLOCKID	Populated from 2010_Census_Block_FIPS_Code (next 4 digits)
BLOCKSUBGROUP	Set to null
FULLFIPSID	First 15 digits of 2010_Census_Block_FIPS_Code See discussion of Census blocks below.
TRANSTECH	As supplied in column Technology_of_Transmission
MAXADDOWN	As supplied
MAXADUP	As supplied
TYPICDOWN	Set to null
TYPICUP	Set to null
SHAPE	Copied from Year 2000 Census Bureau reference data, As matched by Census block 2000 ID

Internal processing notes:

1. No anomalies were noted in the data

NTIA Table BB_Service_RoadSegment

Loaded from supplied text file "NJ - Wireline Service By Street Segment with Speeds (Dec 2012).txt" and from road segments discovered in large census blocks our calculations put at slightly larger than two square miles (See item 2 above). The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	Set to "Verizon Online LLC"
DBANAME	Set to "Verizon"
PROVIDER_TYPE	Set to 1
FRN	Set to "0012254363"
ADDMIN	Set to the least of the address numbers, if any
ADDMAX	Set to the greatest of the address numbers, if any
PREDIR	Set to null (no value supplied)
STREETNAME	As supplied (has all street components, not just name)
STREETTYPE	Set to null (no value supplied)
SUFFDIR	Set to null (no value supplied)
CITY	Set to null (no value supplied)
STATECODE	Set to "NJ"
ZIP5	Set to null (no value supplied)
ZIP4	Set to null (no value supplied)
TRANSTECH	As supplied
MAXADDOWN	As supplied
MAXADUP	As supplied
TYPICDOWN	Set to null (no value supplied)
TYPICUP	Set to null (no value supplied)
TLID	As supplied
SHAPE	Copied from Census Bureau TigerLine 2010, As matched by County + Tiger Line ID

Internal notes on processing:

1. All rows were supplemented with a line-segment shape from the Census Bureau's TigerLine data set.
2. We removed 108 records from the Verizon submitted data that were duplicates, based on county and tlid.
3. We removed 12 records from the Verizon submitted data that had entries in the tlid field that did not match our list of street segments in large census blocks.

Section 5: Clarification Questions and Responses

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Tuesday, February 21, 2012 8:48 AM
To: 'laura.a.shine@verizon.com'
Cc: 'Clemons, Keefe B'
Subject: Question on NJ Broadband Data from Verizon

Laura and Keefe,
I believe we raised this issue in the past, but the NTIA wants us to ensure that we have the most accurate and complete data possible. The data you submitted on the middle mile access points (NJ - POP List (Dec 2011).xls) does not include information on elevation, serving facility capacity, or service facility type at these addresses. Would you be willing and able to provide this information?

John Wullert
Manager - NJ BB Data Collection
Applied Communication Sciences
732-699-2687

From: Clemons, Keefe B [mailto:keefe.b.clemons@verizon.com]
Sent: Tuesday, February 21, 2012 9:43 AM
To: 'NJ Broadband Data Collection'; Shine, Laura A
Subject: RE: Question on NJ Broadband Data from Verizon

John:

The data we provided is consistent with the data that we have provided for all prior rounds of data collection, and is consistent with the level of detail we provide in every state in which we provide this data. Given the sensitivity of this information, we are not prepared to provide additional information regarding our middle mile facilities.

Feel free to contact me if you have any additional questions.

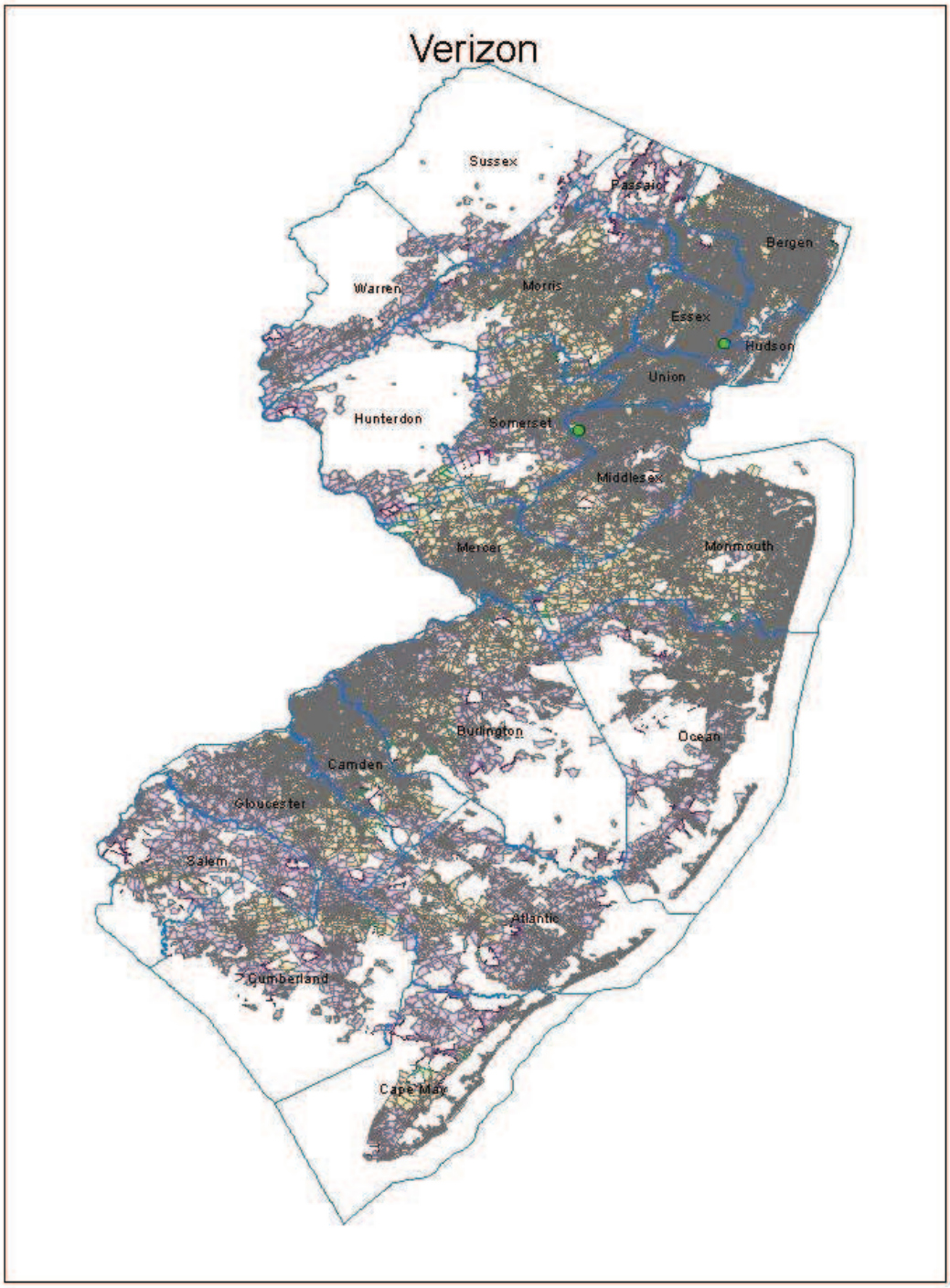
Sincerely,

Keefe

Keefe B. Clemons
General Counsel - Northeast Region
Verizon
140 West Street, 27th Floor
New York, New York 10007-2109
(212) 321-8136 (Phone)
(212) 962-1687 (Fax)
keefe.b.clemons@verizon.com

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



Connecting New Jersey - Broadband Provider Data Report

Provider: Verizon Wireless
Received: January 2013
Submission date: April 2013

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

NDA was executed.

Section 2: Submission Overview

<table>
<tr><th colspan="4">AVAILABILITY DATA</th></tr>
<tr><td>ID</td><td colspan="2">Provider name
“Doing business as” name
FRN
Holding company name
Holding company number</td><td>Cellco Partnership
Verizon Wireless
0003290673
Verizon Communications Inc.
131425</td></tr>
<tr><th colspan="4">FOR WIRELESS</th></tr>
<tr><td>Filetypes</td><td colspan="2">shapefile collection: shp/dbf/prj/shx, mdb, gdb, imagefile etc. Two sets of data provided – one for EVDO and one for LTE (this was not explicitly stated - infered from the file names).</td><td>Supplied 2 shapfiles (zip archive) with 42 and 63 rows. Shapefiles use projection GCS_WGS_1984..</td></tr>
<tr><td>Speeds</td><td colspan="2"><table>
<tr><th>Type</th><th>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode)</th></tr>
<tr><td>Upstream max adv</td><td>500 - 800 kbps</td></tr>
<tr><td>Downstream max adv</td><td>600 kbps - 1.4 mbps</td></tr>
<tr><td>Upstream typical</td><td>500k-800kbps</td></tr>
<tr><td>Downstream typical</td><td>600kpbs-1.4mbps</td></tr>
<tr><td>Subscriber-weighted</td><td>Not provided</td></tr>
</table></td><td>Ranges provided instead of single values. Lower end of the Down Typical range is ~~OUTSIDE~~ of the Broadband speed definition (will use upper end values for the time being).</td></tr>
<tr><td>Speeds</td><td colspan="2"><table>
<tr><th>Type</th><th>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode)</th></tr>
</table></td><td></td></tr>
</table>

	Upstream max adv	5 mbps	Ranges provided instead of single values.
	Downstream max adv	12 mbps	
	Upstream typical	2mbps -5mbps	
	Downstream typical	8.5 mbps	
	Subscriber-weighted	Not provided	
Technology Type	Spectrum (Mhz, FCC code)		Code 80 [Cellular (824-849Mhz, 869-894 Mhz); PCS 1850-1990 Mhz; AWS (1710-1755Mhz, 2110-2155Mhz); 700 (757-758Mhz, 776-779Mhz, 787-788Mhz, 805-806Mhz)] One of the provided Spectrum ranges (1st set) is 869-894 Mhz, which is not within ranges defined for that spectrum The shapefiles are named “NJ_evdo” and NJ_lte suggesting that the availability is only for EVDO and LTE. Verizon Wireless documents on the web suggest the company uses spectrum 850 MHz and 1900 MHz for their EVDO.
Comments:			

INTERCONNECTION DATA	
ID	
File size	
Ownership	
Transport Type	
Data Rates/Capacity	
Location	
Comments:	

Section 3: Submission File Details

A link to download the data was supplied by email.

Received overview file “Verizon Wireless Broadband Statistics - January 2013 Update.doc.doc.doc" with spectrum and speed information.

Received 2 zip files:

- NJ_evdo.zip (4,589,631 bytes)
- NJ_lte.zip (3,316,393 bytes)

2 shapefiles contain the following contents. The NJ_EVDO shapefile has 63 polygons, and the NJ_lte shapefile has 42 polygons.

Name	Size
NJ_evdo.dbf	2 KB
NJ_evdo.prj	1 KB
NJ_evdo.sbn	1 KB
NJ_evdo.sbx	1 KB
NJ_evdo.shp	6,063 KB
NJ_evdo.shp.xml	14 KB
NJ_evdo.shx	1 KB
NJ_lte.dbf	1 KB
NJ_lte.prj	1 KB
NJ_lte.sbn	1 KB
NJ_lte.sbx	1 KB
NJ_lte.shp	6,003 KB
NJ_lte.shp.xml	200 KB
NJ_lte.shx	1 KB

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_Service_Wireless

Loaded from the supplied shapefiles. The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	As supplied in Word document
DBANAME	As supplied in Word document
FRN	Set to "0003290673"
TRANSTECH	Set to 80 per Word document
SPECTRUM	NJ_EVDO: Set to “3” per translation shown below

	VZW_NJ_LTE: Set to "2"
MAXADDOWN	NJ_EVDO: Set to “3”, see below. VZW_NJ_LTE: Set to "7" per email clarification
MAXADUP	NJ_EVDO: Set to “2”, see below. VZW_NJ_LTE: Set to "5" per email clarification
TYPICDOWN	NJ_EVDO: Set to “3”, see below. VZW_NJ_LTE: Set to "6" per email clarification
TYPICUP	NJ_EVDO: Set to “2”, see below. VZW_NJ_LTE: Set to "5" per email clarification
STATEABBR	Set to “NJ”
SHAPE	As supplied.

Internal notes on processing:

31. Shapefile NJ_evdo: The total shape apparently covers the entire state of New Jersey. Some differences are visible along the water body edges. No need to check duplicates since they will be coalesced into 1 polygon. The supplied shape uses geographic coordinate system name GCS_WGS_1984. The NTIA data model requires the same coordinate system. No geographic transformation was required.
32. Shapefile NJ_lte: The shape covers portions of New Jersey; the NJ Turnpike appears to be covered for its entire length. No need to check duplicates since they will be coalesced into 1 polygon. The supplied shape uses geographic coordinate system name GCS_WGS_1984. The NTIA data model requires the same coordinate system. No geographic transformation was required.
33. The XY Tolerance value differs on the supplied data from the required NTIA model. Imported the table schema and the table data in two separate operations, thereby ensuring perfect compatibility with the NTIA data model. The tables have the suffix “_tol”.
34. Coalesced the EVDO single-part polygons into one multi-part polygon using the ArcGIS ESRI: Data Management Tools->Generalization->Dissolve (with choosing state in the Dissolve_Field(s) option), which resulted in a new feature class with the suffix “_dissolved”.
35. Coalesced the LTE single-part polygons into one multi-part polygon using the ArcGIS ESRI: Data Management Tools->Generalization->Dissolve ((with choosing state in the Dissolve_Field(s) option), which resulted in a new feature class with the suffix “_dissolved”.
36. NTIA requires shapes to be contained in the NJ state boundary. Although we visually verified that it is the case, we clipped the shapes using ESRI: Analysis Tools-> Extract -> Clip with, select feature class refdata_2010.tl_2010_34_state10_wgs. The feature class has the suffix "_clip"
37. Spectrum:
    a. NJ_EVDO: Verizon Wireless provided a statement in their cover letter about their licensed spectrum. Searching on the web indicates that EV-DO uses frequencies 850MHz and 1900Mhz. The NTIA data model has a single column for spectrum. No mapping is provided for frequency 850MHz. Frequency 1900MHz corresponds to NTIA “SPECTRUM USED”

code value 3.

b. VZW_NJ_LTE: Verizon wireless web site advertises "nationwide contiguous 700 Mhz 4G spectrum. The NTIA coding table provides value 2 for 700Mhz spectrum.

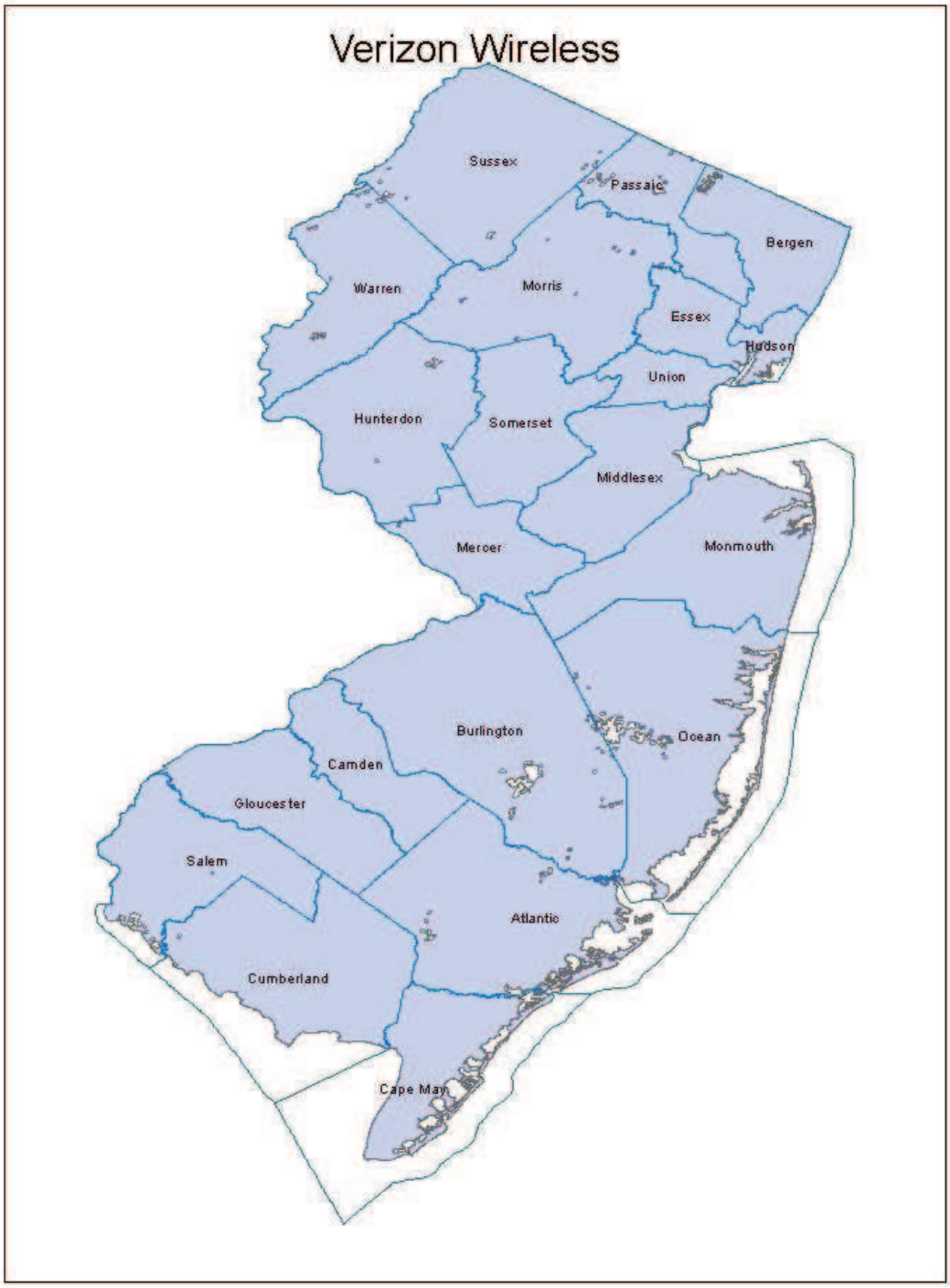
38. Speeds:
    a. NJ_EVDO: The maximum advertised speeds provided in the cover letter are 600 kbps - 1.4 mbps down and 500 - 800 kbps up. The typical speeds are provided as ranges: 600k to 1.4 mbps down and 500 kbps-800 kbps up. For max adv speeds we encoded the submitted down speed as value 3 (range 768k-1.5Mbps) and encoded the submitted up speed as value 2 (range 200-768kbps).
    b. VZW_LTE_NU: The supplied Word document suggests speeds are "10 times EVDO". The maximum advertised speeds provided in the cover letter are 12 mbps down 5 mbps up. The typical speeds are provided as ranges: 8.5 mbps down and 2 - 5 mbps up. For max adv speeds we encoded the submitted down speed as value 7 (range 10-25 mbps) and encoded the submitted up speed as value 5 (range 3-6 mbps). Compliant with the same NTIA email directive, we encoded typical down speed as “6” (range 6 mbps – 10 mbps), and typical up speed as “5” (range 3 mbps – 6 mbps).
39. The only data imputed was the state abbreviation.

Section 5: Clarification Questions and Responses

We received a warning on the wireless shape record for the combination of downstream speed code of 7 (10-25 Mbps) with a transtech code of 80 (Mobile Wireless). The maximum advertised speeds provided in the cover letter that came with the provider’s submission are 12 mbps down and 5 mbps up. The typical speeds are provided as ranges: 8.5 mbps down and 2-5 mbps up.

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



Connecting New Jersey - Broadband Provider Data Report

Provider: ViaSat, Inc.
Received: July 2012
Submission date: October 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

NONE

Section 2: Submission Overview

<table>
<tr><td colspan="5">AVAILABILITY DATA</td></tr>
<tr><td>ID</td><td colspan="2">Provider name
“Doing business as” name
FRN</td><td colspan="2">ViaSat, Inc.
ViaSat, Inc.
0004963088</td></tr>
<tr><td colspan="5">FOR WIRELESS</td></tr>
<tr><td>Filetypes</td><td colspan="4">text file, shape file</td></tr>
<tr><td>File size</td><td colspan="4"></td></tr>
<tr><td>Speeds</td><td colspan="3"><table>
<tr><td>Type</td><td></td><td>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)</td></tr>
<tr><td>Typical-upstream</td><td></td><td>Not provided (‘0’)</td></tr>
<tr><td>Typical-downstream</td><td></td><td>Not provided (‘0’)</td></tr>
<tr><td>Advertised-upstream</td><td></td><td>yes. Entire state.</td></tr>
<tr><td>Advertised-downstream</td><td></td><td>yes. Entire state</td></tr>
<tr><td>Subscriber-weighted-up</td><td></td><td>Not provided</td></tr>
<tr><td>Subscriber-weighted-down</td><td></td><td>Not provided</td></tr>
</table></td><td>Submitted shape file describing the entire state of NJ with attributes for technology and maximum advertised up/down speed codes. Spectrum is listed as “Satellite”.

Second submission from WildBlue included values in Mbps for maximum advertised up/down speeds:
Download: 1.5 Mbps
Upload: 0.25 Mbps

These correspond to the speed tiers 4 and 2, respectively.</td></tr>
<tr><td>Technology Type</td><td colspan="4">Code 60 (Satellite)</td></tr>
<tr><td>End-user specification</td><td colspan="4"></td></tr>
<tr><td colspan="5">Comments: From the provider’s input package:
WildBlue notes that of the possible ‘Spectrum Used’ options provided, none list Ka-Band as an</td></tr>
</table>

option for Satellite Providers.	
INTERCONNECTION DATA: NONE	
ID	
File size	
Ownership	
Transport Type	
Data Rates/Capacity	
Location	
Comments: Not provided	

Section 3: Submission File Details

Size	Name
116	ViaSat_AreaAvailability_NJ_region.shx
654	ViaSat_AreaAvailability_NJ_region.dbf
165	ViaSat_AreaAvailability_NJ_region.prj
179,268	ViaSat_AreaAvailability_NJ_region.shp

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_Service_Wireless

The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	Set to "ViaSat, Inc."
DBANAME	Set to "ViaSat, Inc."
FRN	~~Set to 0007843766~~ Set to 0004963088
TRANSTECH	Set to 60
SPECTRUM	Set to 9 per translation shown below
MAXADDOWN	As provided, confirmed from speed data
MAXADUP	As provided, confirmed from speed data
TYPICDOWN	Not provided, set to null
TYPICUP	Not provided, set to null
STATEABBR	Set to “NJ”
SHAPE	County shape read from reference data.

Internal notes on processing:

40. Spectrum: WildBlue uses Ka-Band spectrum (uplink in the 29.5 – 30 gigahertz band and downlink in the 19.7 – 20.2 gigahertz band). While this is not specifically included in the list of satellite frequencies associated with Code 9, we used code 9 anyway. This is a change from previous submissions. (from the last submission)
41. The shape file contains 2 polygon shapes.
42. The supplied shape file uses geographic coordinate system name GCS_North_American_1983. The NTIA data model requires GCS_WGS_1984 geographic coordinate system. Thus transformation is required. The XY Tolerance value differs on the supplied data from the required NTIA model. Imported the table schema and the table data in two separate operations, thereby ensuring perfect compatibility with the NTIA data model. The table has the suffix "_wgs_tol".
43. NTIA requires shapes to be contained in the NJ state boundary. Although we visually verified that it is the case, we clipped the shape using ESRI: Analysis Tools-> Extract -> Clip with, select feature class refdata_2010.tl_2010_34_state10_wgs. The feature class has the suffix "_clip"

Section 5: Clarification Questions and Responses

Subject: Round 6 Broadband Mapping Project New Jersey
Date: Tue, 24 Jul 2012 21:45:30 +0000
From: Hill, Janel <Janel.Hill@viasat.com>
To: connectingnj@appcomsci.com <connectingnj@appcomsci.com>

Greetings,

The attached data is being submitted by ViaSat, Inc. for Round 6 of the Broadband Mapping Program. Please note the following:

1.ViaSat, Inc. is the parent company of ViaSat Communications, Inc. which was formerly known as WildBlue Communications, Inc. Prior submissions were made in the name of WildBlue Communications. Please update your state's map to reflect that ViaSat, Inc. is now the name of the provider.

2.ViaSat provides high speed internet service over several ka band satellites which together cover the entire United States.

3.The speed of the service depends on which satellite is covering the particular area. The attached data consists of the maximum advertised upload and download speeds at the census block level. In most locations, ViaSat's speeds are significantly in excess of the speeds set forth in the NTIA Tiers for "Satellite

Technology” so we are reporting the actual maximum advertised upload and download speeds.

4.During the first quarter of 2012, ViaSat launched two new services named Exede 5 and Exede 12. Exede 5 has a maximum advertised upload speed of 1 Mbps and a maximum advertised download speed of 5 Mbps. Exede
12 has a maximum advertised upload speed of 3 Mbps and a maximum advertised download speed of 12 Mbps. The attached data shows which of the two services are available on a census block basis. In limited geographic areas, neither of the two new services are available, in which case the data reflects the maximum advertised upload and download speeds for ViaSat’s legacy service called the WildBlue service. The WildBlue service has a maximum advertised upload speed of 256 Kbps and a maximum advertised download speed of 1.5 Mbps.

5.The attached data is current as of June 30, 2012.

Thank you for the opportunity to participate. We look forward to seeing ViaSat’s updated information included in your state’s broadband map. If you have any questions, feel free to contact me.

Kind Regards,

Janel Hill//

Paralegal | ViaSat, Inc | 6155 El Camino Real | Carlsbad, CA 92009

janel.hill@viasat.com| 760-476-4716

Subject: RE: Round 6 Broadband Mapping Project New Jersey
Date: Wed, 25 Jul 2012 20:41:37 +0000
From: Hill, Janel <Janel.Hill@viasat.com>
To: Connecting NJ <ConnectingNJ@appcomsci.com>

Hi Cliff,

The filing is being sent by ViaSat, Inc., which is the parent company of ViaSat Communications, Inc. It is not a DBA situation but rather, a parent/subsidiary relationship.

We have two FRN's, please use these:

ViaSat: 0004963088
ViaSat Communications: 0007843766

Kind Regards,

Janel Hill

Paralegal | ViaSat, Inc | 6155 El Camino Real | Carlsbad, CA 92009
janel.hill@viasat.com | 760-476-4716

-----Original Message-----
From: Connecting NJ [mailto:ConnectingNJ@appcomsci.com]
Sent: Wednesday, July 25, 2012 10:03 AM
To: Hill, Janel
Subject: Re: Round 6 Broadband Mapping Project New Jersey

Janel,

We have a couple of questions regarding your name change:

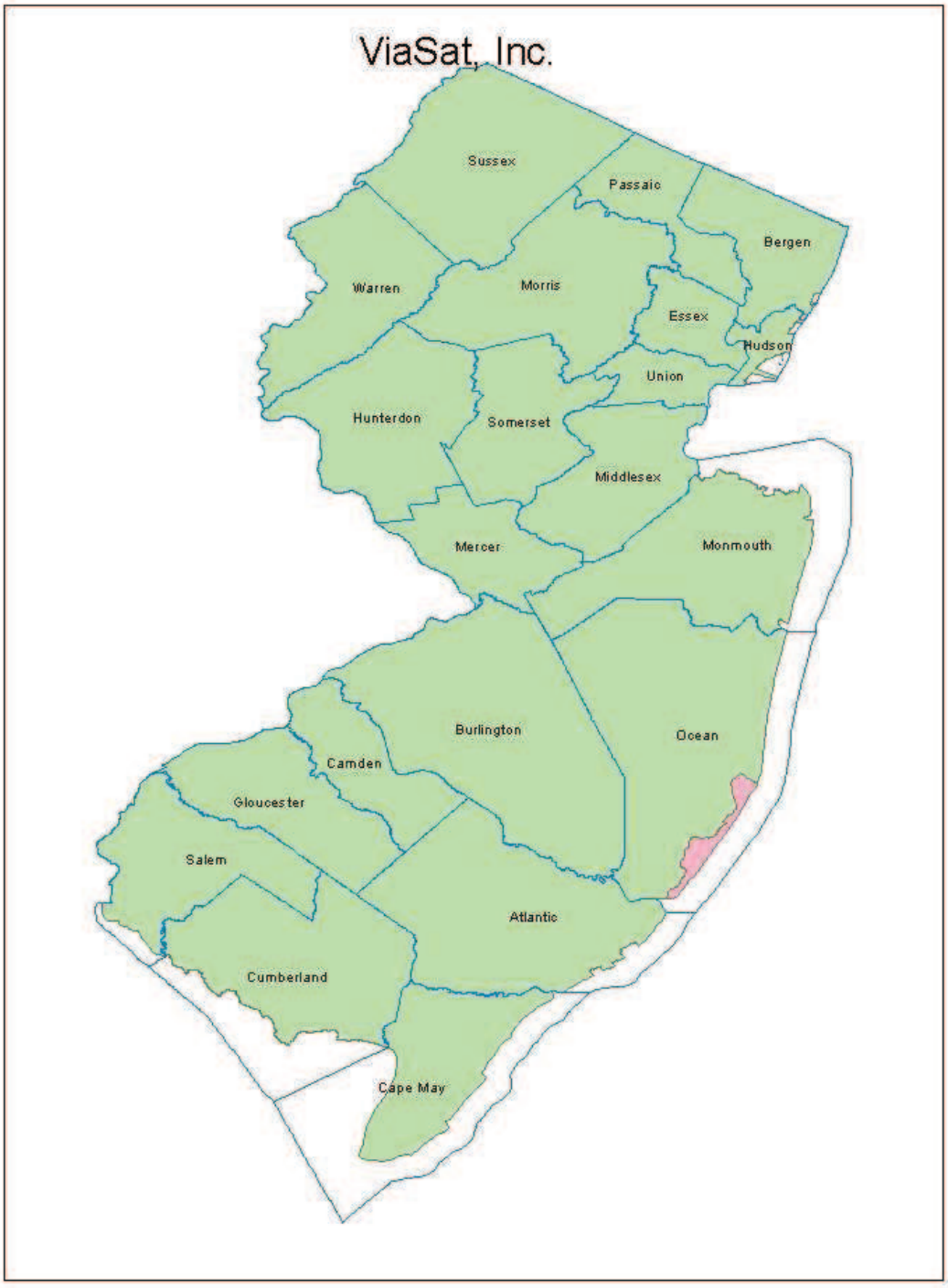
1. We are using "0007843766" for your FRN. Should we use this or do you have another?
2. What is your DBA name? Should we also use ViaSat for this?

Thanks,

Cliff

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



Connecting New Jersey - Broadband Provider Data Report

Provider: Xchange Telecom
Connecting New Jersey - Broadband Provider Data Report

Provider: Xchange Telecom
Received: March 2011
Submission date: March 2013

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

For April 2013:
This is a stub report, since data from the previous submission was reused unchanged. The complete report from the previous submission begins on the next page. Notable differences from the processing done on the previous submission are listed next.

Processing Steps:

14. Used ESRI: Data Management Tools->General->Append with NO_TEST schema type to copy xchange_oct2012.BB_Service_CensusBlock to xchange _apr2013. BB_Service_CensusBlock.

For October 2012:

This is a stub report, since data from the previous submission was reused unchanged. The complete report from the previous submission begins on the next page. Notable differences from the processing done on the previous submission are listed next.

Section 1: NDA Status

None

Section 2: Submission Overview

AVAILABILITY DATA				
ID	Provider name “Doing business as” name FRN			Xchange Telecom Corp Xchange Telecom 0006831713
FOR WIRELINE				
Filetypes				
File size				
Speeds	Type		Spatial Resolution	Information provided via email

			(address, street seg, census block, RSA/MSA, zipcode,etc)	exchange (see below). Provider originally indicated that their coverage was limited to the area supported by a single central office. In further exchanges, the provider indicated that their coverage is limited to city of Lakewood and that they cover the entire city limits.
	Typical-upstream			
	Typical-downstream			
	Advertised-upstream		2 Mbps (code 4)	
	Advertised-downstream		10 Mbps (code 7)	
	Subscriber-weighted-nominal speed			
Technology Type	ADSL (code 10)			
End-user specification	In response to inquiry, provider reported residential and small business.			
Comments:				
INTERCONNECTION DATA				
ID				
File size				
Ownership				
Transport Type				
Data Rates/Capacity				
Location				
Comments:				

Section 3: Submission File Details

Received no file submission, only statements by email.

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_Service_CensusBlock

Based on the emailed statement coverage area, we selected all of the census blocks in Lakewood Township, Ocean county, New Jersey. We submitted all census blocks less than 2 square miles in this municipality. The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	Set to “Xchange Telecom Corp” per email response
DBANAME	Set to “Xchange Telecom”
PROVIDER_TYPE	Set to 2 (reseller leasing plant from Verizon)
FRN	Set to “0006831713” per email response
STATEFIPS	Set to “34” (NJ)
COUNTYFIPS	Pre-populated from Census Block FIPS Code (digits 3-5)
TRACT	Pre-populated from Census Block FIPS Code (next 6 digits)
BLOCKID	Pre-populated from Census Block FIPS Code (next 5 digits)
BLOCKSUBGROUP	Set to null
FULLFIPSID	Populated from Census Block FIPS Code
TRANSTECH	Set to 10 (ADSL) per email
MAXADDOWN	Set to code 7 per email
MAXADUP	Set to code 4 per email
TYPICDOWN	Set to null, not provided
TYPICUP	Set to null, not provided
SHAPE	Census block

Internal processing notes:

42. Created a file with a municipality name that matches exactly the “name” column in the Year 2010 Census Bureau TigerLine database.
43. Joined against reference data to discover census blocks, for a total of 1012 blocks.
44. Verified that all the census blocks discovered for Lakewood Township are smaller than 2 square miles, so no road segments were loaded.
45. Validation script produced a warning on 1012 census blocks regarding downstream speed code of 7 (10-25 Mbps). We were unable to obtain any confirmation of advertised speeds from provider Web site, because it required entry of a specific phone number. The provider confirmed via email that they offer 10 Mbps download speeds.

Section 5: Clarification Questions and Responses

Key provider Data submission messages:

Subject: RE: NJ Broadband Data Collection – Spring 2013
Date: Wed, 20 Mar 2013 21:15:19 +0000
From: Duvid Rottenberg <DRottenberg@xchangetele.com>
To: Connecting NJ <ConnectingNJ@appcomsci.com>

Hi,

There are no changes to our previous submissions. We are providing service in Lakewood township, offering DSL service, with download speeds of 10 Mbps and upload speeds of 2 Mbps.

Thank You,

Duvid Rottenberg

From: Duvid Rottenberg [mailto:drottenberg@xchangetele.com]
Sent: Tuesday, March 08, 2011 3:36 PM
To: ConnectingNJ@research.telcordia.com
Cc: 'Shelley Bates'
Subject: RE:

John,
We are a UNE-L company, we lease the loop from Verizon and provide broadband for the end user on the leased circuits. I believe we do cover the whole city of Lakewood.

Duvid Rottenberg
Xchange Telecom, Corp.
drottenberg@xchangetele.com
(646) 722-7258

From: Duvid Rottenberg [mailto:drottenberg@xchangetele.com]
Sent: Monday, March 14, 2011 4:31 PM
To: ConnectingNJ@research.telcordia.com
Cc: 'Shelley Bates'
Subject: RE:

2 Mbps Upstream and 10 Mbps downstream.

Duvid Rottenberg

From: NJ Broadband Data Collection [mailto:ConnectingNJ@research.telcordia.com]
Sent: Monday, March 14, 2011 4:46 PM
To: 'Duvid Rottenberg'; 'ConnectingNJ@research.telcordia.com'
Cc: 'Shelley Bates'
Subject: RE:

Thanks for this.

One other question – do you serve both residential and business customers?

John

From: Duvid Rottenberg [mailto:drottenberg@xchangetele.com]
Sent: Monday, March 14, 2011 4:57 PM
To: ConnectingNJ@research.telcordia.com
Cc: 'Shelley Bates'

Subject: RE:

Yes we do.

Duvid Rottenberg

Spring 2012 Interactions

From: Duvid Rottenberg [mailto:DRottenberg@xchangetele.com]
Sent: Wednesday, February 29, 2012 1:20 PM
To: NJ Broadband Data Collection
Subject: RE: New Jersey Broadband Data Collection - Third Notice

You can reuse our previous data.

Thank You,
Duvid Rottenberg

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Wednesday, February 29, 2012 2:07 PM
To: 'Duvid Rottenberg'
Cc: NJ Broadband Data Collection
Subject: RE: New Jersey Broadband Data Collection - Third Notice

Duvid,
The data we have states that you cover all of Lakewood township, offering DSL service, with download speeds of 10 Mbps and upload speeds of 2 Mbps. Is that all correct?

Thanks,

John Wullert
Manager - NJ BB Data Collection
Applied Communication Sciences
732-699-2687

From: Duvid Rottenberg [mailto:DRottenberg@xchangetele.com]
Sent: Wednesday, February 29, 2012 2:10 PM
To: NJ Broadband Data Collection
Subject: RE: New Jersey Broadband Data Collection - Third Notice

Yes.

Thank You,
Duvid Rottenberg

Fall 2012 Interactions

Subject: Fwd: NJ Broadband Data Collection - Fall 2012
Date: Mon, 30 Jul 2012 12:03:17 -0400
From: Connecting NJ <ConnectingNJ@appcomsci.com>
To: NJ Broadband Data Collection <ConnectingNJ@appcomsci.com>

All,

I talked to D. Rottenberg this morning and he instructed us to use previous data since Xchange Telecom only provides service in Lakewood and nothing has changed since last submission.

Cliff

-------- Original Message --------
Subject: NJ Broadband Data Collection - Fall 2012
Date: Thu, 12 Jul 2012 12:36:11 -0400
From: Connecting NJ <ConnectingNJ@appcomsci.com>
To: drottenberg@xchangetele.com

Mr. Rottenberg,
We are writing to you on behalf of the New Jersey Office of Information Technology (NJ-OIT) which is responsible for collecting broadband availability data for the National Telecommunications and Information Administration (NTIA) State Broadband Data and Development Grant Program.

We thank you for your participation in the previous round of broadband data collection. We now ask once again for your assistance by submitting data describing your broadband service offerings in the State of New Jersey. To meet the NTIA's data submission timeline, we will need your data submission no later than Friday, August 10, 2012. The data should represent your broadband service offerings as of 6/30/2012.

For this round, the NTIA is particularly interested in receiving from providers "typical" downstream and upstream speeds. By the NTIA definition, "typical" is the "data transfer throughput rate that most subscribers to service at the maximum advertised downstream speed can achieve consistently during expected periods of heavy network usage."

We encourage you to submit data via our secured Web server at http://connectingnj.state.nj.us/. If this presents a problem, please contact us via email and we can make other arrangements.

As mentioned in the previous request, the organization collecting and validating this data on behalf of NJ OIT is now Applied Communication Sciences, formerly Telcordia Advanced Technology Solutions. This is a result of the acquisition of Telcordia by Ericsson. The same people will be the collecting and validating the data, but the email address has changed.

We look forward to hearing from you. Please feel free to contact us with any questions, comments or suggestions.

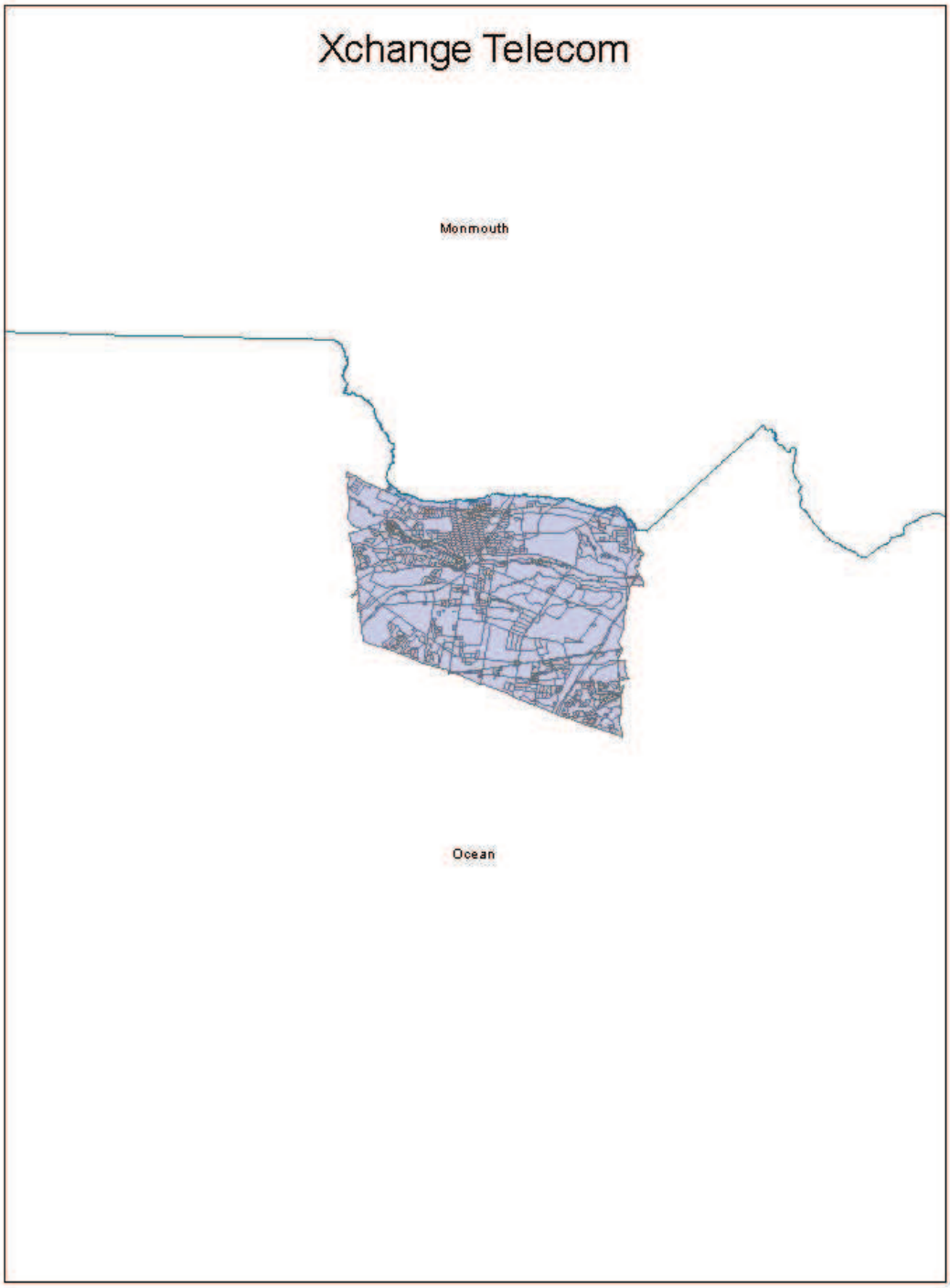
Sincerely,

Cliff Behrens
Manager - NJ BB Data Collection
Applied Communication Sciences
ConnectingNJ@groups.appcomsci.com
732.699.2380

Scott Kloss
Program Manager
NJ Office of Information Technology
scott.kloss@oit.state.nj.us
609.292.4171

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



Connecting New Jersey - Broadband Provider Data Report

Provider: XO Communications
Received: July 2011
Submission date: April 2013

This report presents details on processing broadband data for delivery to the National Telecommunications and Information Administration (NTIA).

For April 2013:
This is a stub report, since data from the previous submission was reused unchanged. The complete report from the previous submission begins on the next page. Notable differences from the processing done on the previous submission are listed next.

Processing Steps:

15. Used ESRI: Data Management Tools->General->Append with NO_TEST schema type to copy xocomms_oct2012.BB_Service_CensusBlock to xocomms _apr2013. BB_Service_CensusBlock.

For October 2012:
This is a stub report, since data from the previous submission was reused unchanged. The complete report from the previous submission begins on the next page. Notable differences from the processing done on the previous submission are listed next.

For April 2012:
This is a stub report, since data from the previous submission was reused unchanged. The complete report from the previous submission begins below. Notable differences from the processing done on the previous submission are listed next.

The provider reported that there were no changes to the reported data. Given that the data we have was submitted in August 2010, we verified with the provider that there were no changes to the coverage area and speeds that they offered.

NTIA Table BB_Service_CensusBlock

Since there is no change in the data and NTIA data model, the table is copied from the 2011 October table, using an ESRI tool, "ArcToolBox->Data Management Tools->General->Append" with NO_TEST in the Schema Type option.

Provider Interactions

```
Subject:    RE: URGENT: Response Requested: Get your Broadband Services on
the Spring 2013 National Broadband Map
```

Date: Thu, 7 Feb 2013 18:48:46 +0000
From: Adams, Sharon E <Sharon.E.Adams@xo.com>
To: 'Connecting NJ' <ConnectingNJ@appcomsci.com>

Hi Cliff,

I do not have any updates for this submission round.

Kind regards,
Sharon Adams

From: Adams, Sharon E [mailto:Sharon.E.Adams@xo.com]
Sent: Wednesday, February 01, 2012 12:02 PM
To: 'NJ Broadband Data Collection'
Subject: RE: NJ Broadband Data Collection - Spring 2012

Neither XO nor Nextlink have any new or revised data to report.

Thanks,
Sharon Adams

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Friday, February 03, 2012 10:15 AM
To: Adams, Sharon E
Cc: 'NJ Broadband Data Collection'
Subject: RE: NJ Broadband Data Collection - Spring 2012

Sharon,
The last time that you submitted data to us was in August of 2010. Are you saying that the area covered by XO services, and the service speeds offered over that area, have not changed in the last year and a half? I just want to make sure that we can accurately reflect the capabilities you have available in the state of New Jersey.

Thanks,

John Wullert
Manager - NJ BB Data Collection
Applied Communication Sciences
732-699-2687

From: Adams, Sharon E [mailto:Sharon.E.Adams@xo.com]
Sent: Friday, February 03, 2012 1:42 PM
To: 'NJ Broadband Data Collection'
Subject: RE: NJ Broadband Data Collection - Spring 2012

Yes.

Thanks,
Sharon Adams

Connecting New Jersey - Broadband Provider Data Report

Provider: XO Communications
Submission date: October 2011

This report presents details on processing broadband data for delivery to the National Telecommunications and Information Administration (NTIA).

This is a stub report, since data from the previous submission was reused unchanged. The complete report from the previous submission begins below. Notable differences from the processing done on the previous submission are listed next.

The provider reported that there were no changes to the reported data. Given that the data we have was submitted in August 2010, we verified with the provider that there were no changes to the coverage area and speeds that they offered.

NTIA Table BB_Service_CensusBlock

1. Column " blocksubgroup" was dropped.
2. Column "endusercat" was added; set to null because data was not supplied.

Notes

1. Discarded 28 records with missing or slow maximum download speed codes.
2. Total rows loaded: 879

Connecting New Jersey - Broadband Provider Data Report

Provider: XO Communications
Submission date: April 2011

This report presents details on processing broadband data for delivery to the National Telecommunications and Information Administration (NTIA).

This is a stub report, since data from the previous submission was reused unchanged. The complete report from the previous submission begins on the next page. Notable differences from the processing done on the previous submission are listed next.

NTIA Table BB_Service_CensusBlock

1. Column "reseller" was dropped.
2. Set the new column "provider_type" to value 1 ("Broadband provider as described in the NOFA")
3. Set the max advertised speed code values (down and up) to 9, which is the maximum value among all records provided to us.
4. Dropped non-measured typical up/down speed code values.

Provider Interactions

From: Adams, Sharon E [mailto:Sharon.E.Adams@xo.com]
Sent: Tuesday, March 01, 2011 4:11 PM
To: ConnectingNJ@research.telcordia.com
Subject: RE: NJ BB Data Collection - Spring 2011

Hi John,

I don't have any new data to report.

Thanks,
Sharon Adams

From: NJ Broadband Data Collection [mailto:ConnectingNJ@research.telcordia.com]
Sent: Tuesday, March 01, 2011 4:23 PM
To: Adams, Sharon E
Cc: ConnectingNJ@research.telcordia.com
Subject: RE: NJ BB Data Collection - Spring 2011

Sharon,
Are you saying that we can use the data you submitted last time (that it reflects your network capabilities as of 12/31/2011)?

John Wullert
Manager – NJ BB Data Collection
Telcordia Technologies

732-699-2687

From: Adams, Sharon E [mailto:Sharon.E.Adams@xo.com]
Sent: Tuesday, March 01, 2011 4:41 PM
To: ConnectingNJ@research.telcordia.com
Subject: RE: NJ BB Data Collection - Spring 2011

Yes, the previous data can be used again.

Thanks,
Sharon Adams

From: NJ Broadband Data Collection [mailto:ConnectingNJ@research.telcordia.com]
Sent: Friday, March 18, 2011 9:34 AM
To: 'Adams, Sharon E'
Cc: 'NJ Broadband Data Collection'
Subject: XO NJBB Data Clarification

Sharon,
We have performed our initial review of your data and have a clarification question:

> We see several locations where your download speeds are a tier 2, which the NTIA does not consider broadband. This appears that it might be the provisioned speed sold to the customer. Is there a higher, advertised speed that you could provision to these locations if the customer asked? One option would be for us to use the highest speed you deliver in a larger area as the maximum advertised speed. Would that accurately represent your ability to deliver service?

John Wullert
Manager – NJ BB Data Collection
Telcordia Technologies
732-699-2687

From: Adams, Sharon E [mailto:Sharon.E.Adams@xo.com]
Sent: Thursday, July 07, 2011 9:56 AM
To: ConnectingNJ@research.telcordia.com
Subject: NJ Broadband Data Collection

Good morning,

Neither XO Communications Services, Inc. nor Nextlink Wireless, Inc. have any updates to previously submitted data. Please advise what steps need to be taken in order to ensure these companies compliance.

Kind regards,
Sharon Adams

From: NJ Broadband Data Collection [mailto:ConnectingNJ@research.telcordia.com]
Sent: Thursday, July 07, 2011 11:13 AM
To: 'Adams, Sharon E'
Cc: 'connectingNJ@research.telcordia.com'

Subject: RE: NJ Broadband Data Collection

Sharon,
Thanks for the quick response. Your email message is sufficient notification for us to proceed using the data you have already submitted.

Note that we will be applying additional validation and verification procedures during this round and will get back to you if any issues arise with the data you supplied.

John Wullert
Manager – NJ BB Data Collection
Telcordia Technologies
732-699-2687

Connecting New Jersey - Broadband Provider Data Report

Provider: XO Communications
Received: August, 2010
Submission date: October 2010

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Sections:

52. NDA Status
53. Submission Overview
54. Submission File Details
55. Data Validations and Results
56. Data Transformation and Loading
57. Clarification Questions and Provider Responses
58. Notes and Open Issues

Section 1: NDA Status

Executed.

Section 2: Submission Overview

<table>
<tr><th colspan="5">AVAILABILITY DATA</th></tr>
<tr><td>ID</td><td colspan="2">Provider name
“Doing business as” name
FRN</td><td colspan="2">XO Communications, LLC
Provided, but looks weird
0006275945</td></tr>
<tr><th colspan="5">FOR WIRELINE</th></tr>
<tr><td>Filetypes</td><td colspan="4"></td></tr>
<tr><td>File size</td><td colspan="4"></td></tr>
<tr><td>Speeds</td><td colspan="4"><table>
<tr><th>Type</th><th></th><th>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)</th></tr>
<tr><td>Typical-upstream</td><td></td><td>census block</td></tr>
<tr><td>Typical-downstream</td><td></td><td>census block</td></tr>
<tr><td>Advertised-upstream</td><td></td><td>census block</td></tr>
<tr><td>Advertised-downstream</td><td></td><td>census block</td></tr>
<tr><td>Subscriber-weighted-up</td><td></td><td>Not provided</td></tr>
</table></td></tr>
</table>

	Subscriber-weighted-down		Not provided	
Technology Type	Entered codes 1, 2, and 3, which are not valid NOFA TechTrans codes.			
End-user specification	Business (444 entries), Residence (5 entries)			
Comments:				
INTERCONNECTION DATA				
ID				
File size				
Ownership				
Transport Type				
Data Rates/Capacity				
Location				
Comments: Not provided				

Section 3: Submission File Details

Received 1 file by SECURE UPLOAD.

Size	Name
41358	NJBroadbandData63009.xlsx

Section 4: Validations and Results

The spreadsheet provides census block IDs and associated max adv and typical speeds. The last two rows of the sheet are different from the 447 data rows proceeding them, and one of those last two is in New York. The DBA name looks unusual and the technology of transmission codes are not valid. After receiving clarification by email we created a corrected spreadsheet based on the original submission as follows:

1. Dropped the last two rows that have addresses instead of provider name, DBA name, etc.
2. Changed DBA Name entries to “XOCSI”
3. Changed technology of transmission codes: 1 to 10, 2 to 20, and 3 to 30.

Section 5: Data Transformation and Loading

NTIA Table BB_Service_CensusBlock

Loaded from the supplied spreadsheet. The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	As supplied in column “Provider Name”
DBANAME	As supplied in column “DBA Name”
RESELLER	Set to “N”
FRN	As supplied in column “FRN”, after adding leading zeros
STATEFIPS	Set to “34” (NJ)
COUNTYFIPS	Populated from column census_block (1st 3 digits)
TRACT	Populated from column census_block (next 6 digits)
BLOCKID	Populated from column census_block (last 4 digits)
BLOCKSUBGROUP	Set to null
FULLFIPSID	As supplied in column census_block
TRANSTECH	As supplied in column Tech Code
MAXADDOWN	As supplied in column MaxDownload
MAXADUP	As supplied in column MaxUpload
TYPICDOWN	As supplied in column TypDownload
TYPICUP	As supplied in column TypUpload
SHAPE	Copied from Census Bureau TigerLine 2010, As matched by Census block ID

Internal processing notes:

1. No duplicate census blocks were found.

Section 6: Clarification Questions and Responses

From: NJ Broadband Data Collection [mailto:ConnectingNJ@research.telcordia.com]
Sent: Tuesday, September 13, 2011 4:07 PM
To: 'Adams, Sharon E'
Cc: ConnectingNJ@research.telcordia.com
Subject: RE: NJ Broadband Data Collection

Sharon,
We realized that we have a potential issue with processing the data you submitted previously. The NTIA has transitioned from using the 2000 census block geometry to the 2010 census block geometry. While it is possible for us to translate your prior data, there is a high risk of overstating or understating your actual coverage area due to the many-to-many mappings between the two sets of census blocks.
Is it possible for you to provide your data using the 2010 geometry?

John Wullert
Manager – NJ BB Data Collection
Telcordia Technologies
732-699-2687

From: Adams, Sharon E [mailto:Sharon.E.Adams@xo.com]
Sent: Tuesday, September 13, 2011 4:10 PM
To: ConnectingNJ@research.telcordia.com
Subject: RE: NJ Broadband Data Collection

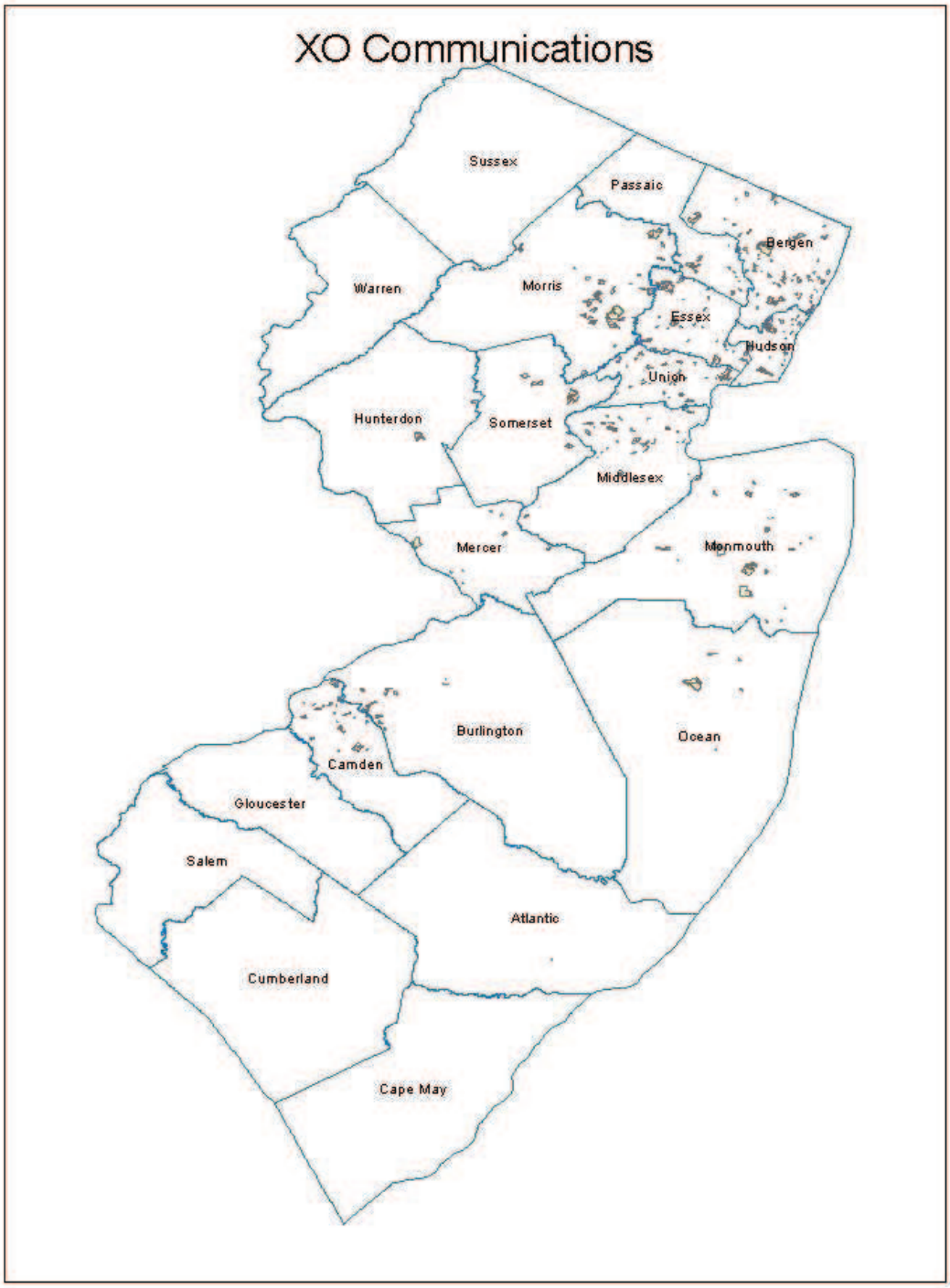
Hi John,

It's fine to restate our data with the new census block geometry. I do not have the new 2010 geometry to restate the data.

Thanks,
Sharon Adams

Section 7: Notes and Open Issues

Section 8: Overview Map of Submitted Data



Appendix B: Community Anchor Institution Processing

Community Anchor Institution Processing

Summary

For each category of community anchor institution, we generally obtained data from two types of sources. One source was a reference source that provided a list of institutions with name, address and ID number where applicable. This reference source was expected to be nearly complete, representing as many of the institutions of the specified type in the state as possible. The other source or sources provided the broadband information. In some cases, the broadband information was supplied by the institutions via our Web site, and in other cases in aggregate form.

In the case of Higher Education, we obtained some broadband access information from NJEdge, an organization that serves as a broadband service provider to a number of universities and research organizations in the state. In the case of State Government, we obtained a list of broadband circuits provided to the state by Verizon; there was no reference list for comparison. For K-12 schools we obtained broadband information on public schools that was collected via a survey by the NJ DOE during the October 2012 submission. During the April 2013 submission we obtained additional broadband data for libraries from the New Jersey State Library. We also incorporated publically-available data on WiFi hotspots in libraries to further identify broadband availability.

We had no reference list for local government and non-governmental organizations; we used only the circuit data plus data collected via our Web site for these classes of institution.

For each CAI category, the following table provides the number of records we obtained from the reference source, the number of broadband access records we obtained, the total number of records we submitted to the NTIA and the number of complete records, with verified address information and broadband access information. Please note that, for the purposes of this Table, a record is considered 'complete' if the broadband indicator field is complete, even if the transtech or speed fields are not known.

Finally, in this submission we performed additional validation on the CAI data to identify and eliminate inconsistencies in the submitted data with respect to technology and speeds.

Table 1 CAI Submission Summary

CAI Category	Reference Records	Broadband Records	Total Records Submitted	Complete Records Submitted
School K-12 (Public)	2686 (DOE)	2428 (DOE) 796 (Web)	3763	2466
School K-12 (Private)	1159 (NCES)			

Libraries	461 (IMLS)	89 (Web) 77 (NJ State Library) 102 (Public WiFi)	474	171
Medical/Healthcare	9349	5	9265	5
Public Safety	343 (NJ 911 Comm.)	120	341	80
University	160 (NCES IPEDS)	41 (NJEdge)	160	40
Other – State and Local Government		2007 (state gov't) 54 (Web)	1692	1692
Other – Non Government		8	8	8

Abbreviations and Acronyms:

911 Comm	New Jersey 9-1-1 Commission
IMLS	Institute of Museum and Library Services
IPEDS	Integrated Postsecondary Education Data System
NCES	National Center for Education Statistics
NJHA	New Jersey Hospital Association
NJ-DHHS	New Jersey Department of Health and Human Services

Local Government and Non-Government Organizations

The procedure and data in this section are unchanged from the October 2011 submission.

1. There were no new submissions to the web site since the October 2011 report. Accepted data submitted by 54 local government and 8 non-governmental organizations via specially designed Web site. We merged data submitted to Web site for April 2011 delivery with that submitted between April and September. The flow named SubmittedCAI_GovNGO_Process.arroyo was used to process the data. (Files lib_20110323-edit.xml and lib_20110907.xml) Data collected included:
    i. Community Anchor Institution Category
    ii. Community Anchor Institution Name (System, Branch)
    iii. Address: Street, City, State, Zip, County
    iv. Contact info: Name, Phone, Email, Web address
    v. Wi-Fi access
    vi. Broadband info: Provider, Technology, Upstream and Downstream speeds
    vii. Comment
2. Generated Latitude and Longitude via geo-coding using Yahoo geocoder API.

a. Ensured no errors were present, that at least one entry was returned and that quality metric was over 75. Also ensured that result was in New Jersey and that city and zip were not both blank.
Output is in file Submitted_GovNGO_CAIs.xls.

State Government

The procedure and data in this section are unchanged from the previous submission.

1. Obtained a listing of 2007 connections provided by the primary broadband service provider, Verizon, to the state. List of connections included the following data:
    a. Service address
        i. This field included an indication of the office or department being served and an extremely abbreviated version of the address
        ii. e.g.: "(SPNL)STATE OF NJ-TLS 19 LANDIS AV, UP DRFLD T"
    b. Speed (single value, 1.5 to 1000 Mbps)
    c. Technology (ATM, Ethernet, Frame Relay, PRI, Point-to-Point
2. Used an automated process to expand the town names in the Service Address field (flow for steps 2-6 is in file VerizonList_Geocode.arroyo; input file is Broadband Mapping Prod Sum 2500 Feb 11_Addressed_Ida_Murray4.xlsx)
    a. For example, replaced "PRSPY" with "Parsippany" and "FR LN" with "Fair Lawn"
    b. Improved the mapping of abbreviated city names to their expansions
        i. BRIG: Brigantine
        ii. BRDTN: Bordentown
        iii. DVR: Dover
        iv. HMTN: Hammonton
        v. LWR TWP: Lower Township
        vi. MAN: Manchester
        vii. MANT: Mantua
        viii. MIDL TWP: Middle Township
        ix. MIDLTN TWP: Middletown
        x. OAKLN: Oaklyn
        xi. PIT: Pitman
3. Extracted address information from Service Address field by removing the following:
    a. Digits following and including a pound sign (e.g., NJ STATE PAROLE DIST **#6** 210 S BROAD)
    b. P.O Box NNNN,
    c. Anything in parentheses (e.g., **(SPNL)**STATE OF NJ:OIT 90 STATE HWY NO 183)
    d. Any string consisting solely of letters, backslashes, colons, dashes, ampersands and spaces prior to the first number string in the address (e.g., **SONJ:DOE** 7 GLENWOOD AV, E O BLDG FLR 4;DES SUITE 401-402)

e. Any string after the first comma (e.g., 7 GLENWOOD AV, **E O BLDG FLR 4;DES SUITE 401-402**
f. Text prior to and including an ampersand (e.g., **NJ STATE DOT @** ROUTE 23)
g. Replacing AV, with AVE,
h. Any text between commas (e.g., 3810 NEW JERSEY AV, **WILD DES DEPT LABOR,**)
i. Any number preceded by "PROJECT" or "PRJCT"

4. Merged city information and state information with extracted addresses.
5. Generated Latitude and Longitude via geo-coding using Yahoo geocoder API.
    a. Ensured no errors were present, that at least one entry was returned
    b. Ensured that state was New Jersey and that city and state values were populated.
6. For those that failed test with Yahoo geocoder API, attempted to match with Google geocoder API
    a. Ensured no errors were present, that at least on entry was returned
    b. Ensured that state was New Jersey and that city and state values were populated.
7. Resulted in successful geocoding of 1941 of the 2007 entries. Entries that could not be geocoded were ones with no street address and those whose street addresses were deliberately disguised.
    a. Results are in file Verizon_Geocoded_new.xls

Healthcare

There were no new broadband data related to healthcare facilities in this round. However, the reference data for the healthcare category were expanded by including long term care facilities in addition to the existing sub-categories of acute care facilities (hospitals), pharmacies and clinical laboratories.

1. Acute Care and Long Term Care Geocoding:
    a. Obtained a listing of 1370 Acute Care facilities and 775 Long Term Care facilities from NJ Department of Health website (http://nj.gov/health/healthfacilities/search/ac.shtml) List of hospitals included the following data:
        i. Facility Name
        ii. Address: Street, City, State, Zip
    b. The healthcare facilities were geocoded using the Yahoo Goecoder API (HHS_HospitalProcess.arroyo). The output was checked to ensure that the street address was not blank, the state was New Jersey and the city was not blank.
    c. Those that were not successfully geocoded were then passed to the Google Geocoder. This resulted in successful geocoding of 1360 Acute Care and 773 Long Term Care facilities.
2. Obtained a list of 2035 pharmacies whose source was the e-prescribe data from Surescripts. The pharmacies were geocoded using the Yahoo Goecoder API and the Google Geocoder in the flow PharmacyProcess.arroyo. The output was checked to ensure that the street address was not blank, the state was New Jersey and the city was not blank. This resulted in successful geocoding of 2020 pharmacies.

3. Obtained listing of 6141 clinical laboratories from the CDC website (http://wwwn.cdc.gov/clia/oscar.aspx). The list (clia-labs.csv) provides name, address and location of laboratory.
    a. Of this list, we eliminated the labs that were located in hospitals, long term facilities and pharmacies because of the overlap with the other sub-categories and because the NTIA data model only identifies a single category for all healthcare institutions.
    b. The remaining labs were geocoded using the Yahoo Geocoder API and the Google Geocoder API. This resulted in successfully geocoding 5433 labs using the flow CLIA_Labs_Geocode.arroyo.
4. The four lists formed the reference geolocated list for healthcare institutions.
5. Merged reference data with data collected from 5 hospitals via our hosted Web site to merge address and ID information with speed and Wi-Fi availability information. We merged data submitted to Web site for April 2011 delivery with that submitted between April and September. No new data after September 2011. (Files lib_20110323-edit.xml and lib_20110907.xml)
    a. Performed exact match between and submitted data on institution name
        i. Facilitated matching by Converting names to upper case, removing certain common words (THE, HOSPITAL, MEDICAL, CENTER, SYSTEM, HEALTHCARE), removing double spaces and trimming leading and trailing spaces.

    This portion of the process occurs in SubmittedCAI_Healthcare_Process.arroyo. Output is in file Healthcare_Submitted_Matched.xls.
6. Produced about 9349 healthcare records at the end of the processing with 5 that included broadband information.

Higher Education

1. Obtained the following data from the named sources in January-February 2013
    a. List of higher education institutions from National Center for Education Statistics IPEDS Data Center (http://nces.ed.gov/collegenavigator/?s=NJ). Table included information on 160 institutions with the following fields:
        i. Institution Name
        ii. Address: Street, City, County, State, ZIP
        iii. IPEDS ID

    Final input data, including a few manual edits (see below) is in file CollegeNavigator_Search_2013-02-06_10.55.01-edit.xlsx

    b. Generated Latitude and Longitude via geo-coding using Yahoo geocoder API (flow IPEDS_HigherEd_Geocode.arroyo).
        i. Ensured no errors were present, that at least one entry was returned
        ii. Ensured that state was New Jersey and that city and state values were populated.

c. For those that failed test with Yahoo geocoder API, attempted to match with Google geocoder API (Flow IPEDS_HigherEd_Geocode.arroyo)
    i. Ensured no errors were present, that at least one entry was returned
    ii. Ensured that state was New Jersey and that city and state values were populated.
d. All 160 institutions were properly geocoded.

2. Obtained an updated list of members of NJEdge (Format-edited version is in file Mapping Bandwidth_Mb_01292013_edit.xlsx). Table included information on 50 institutions, most of which (41) were unique state, community or private institutions of higher learning. Information from NJEdge included:
    i. Institution Name
    ii. Address
    iii. Technology Type
    iv. Upstream and downstream speeds
3. Merged IPEDS and NJEdge data to match institution data with broadband access information (HigherEd_Merge.arroyo)
    a. Performed exact match on institution name
        i. Facilitated matching by Converting names to upper case and trimming excess spaces
    b. Of those NJEdge data entries that did not match, used approximate matching based on institution name
        i. Preprocess prior to approximate match involved
            1. Removing strings COLLEGE, UNIVERSITY, NEW JERSEY
            2. Removing any punctuation
        ii. Matched using Levenshtein Distance metric with threshold of 4.
    c. Reviewed unmatched NJEdge data manually and identified additional matches.
4. Successfully merged data from 36 NJEdge institutions into IPEDS data
5. The unmatched NJEdge records were geocoded using the addresses listed in the NJEdge data. 4 of the 5 unmatched records were successfully geocoded and included in the final output. Final output is in file HigherEd_Geocoded_RateMatched_01292013.xls

Libraries

1. Obtained the following data from the named sources
    a. Obtained the file Public Libraries Survey Fiscal Year 2010 from http://harvester.census.gov/imls/data/pls/index.asp. Used file puout10a.txt
        i. Manually extracted 462 records for the state of New Jersey
        ii. Used the following data items:
            1. FSCSKEY
            2. FSCS_SEQ
            3. LIBNAME
            4. ADDRESS

5. CITY
6. ZIP
7. LATITUDE
8. LONGITUDE

Manually changed the town name for W. Patterson Library to new official name of Woodland Park.

b. Obtained a list of 77 libraries from the New Jersey State Library that provides broadband service via a service called JerseyConnect. The data consisted of:
    i. Library name
    ii. Address
    iii. Type of connection
    iv. Bandwidth of connection
c. Data submitted by 89 library organizations via specially designed Web site. No new data were submitted after September 2011. Corrected the category type for Summit Public Library, which was mis-categorized as a hospital. Data collected included same fields listed above for Local Governmental organizations

2. Merged JerseyConnect libraries with the library survey data using the name of the library to merge address, geolocation and ID information with broadband speed and technology information. Some manual correction of names was required, e.g. Public vs. Pub, Township vs. Twp, etc. The merge yielded 67 matches for the JerseyConnect libraries and the remaining were ignored.
3. Merged library survey data with data collected from libraries via our hosted Web site to merge address and ID information with speed and Wi-Fi availability information.
    a. Performed exact match between survey and submitted data on library name
        i. Facilitated matching by Converting library names to upper case, cutting submitted names to fixed-field length of survey data (60 characters) and trimming excess spaces
    b. For those submitted data entries that did not match, performed an approximate match based on library name
        i. Preprocess prior to approximate match involved
            1. Removing strings P.L., FREE, PUBLIC, LIBRARY, TOWNSHIP, TSWP, PUB, LIB, THE, SYSTEM
            2. Removing any punctuation
            3. Converting NO/SO at start of line to NORTH and SOUTH respectively
        ii. Matched using Levenshtein Distance metric with threshold of 3.
    c. Manually changed the names of some libraries to make them consistent between reference data and submitted entries with respect to library name (town name vs. specific name).
    d. Successfully matched all but ten submitted entries to Library Survey Data

i. Remaining ten were branches of Newark Public Library, but all were submitted with the same address, so they could not be successfully geocoded.

4. Finally, obtained list of WiFi hotspots located in 102 libraries through webscraping from the website http://www.openwifispots.com/categorystate_free_wifi_wireless_hotspot_Library-19_NJ.aspx. 97 of these were matched with the library survey list and the data was used to augment the library broadband information in cases where we did not have earlier broadband or wireless data on the libraries.
5. The new sources of broadband data helped increase the number of complete records to 171 out of 474 records. There were several cases where a library had multiple service providers, either multiple providers submitted via the website or provider from the website and JerseyConnect. In such cases, we included all the individual records for the same library.

All of the above processing was performed using the Arroyo flow CAI_Library_LibConnect_Process.arroyo.

Private K-12 Schools

There were no updates to the broadband data related to private schools in this round.

1. Obtained the following data from the named sources:
    a. Latest list of private K-12 education institutions from National Center for Education Statistics Private School Universe Survey (http://nces.ed.gov/surveys/pss/privateschoolsearch/). Table included information on 1159 institutions with the following fields:
        i. Name
        ii. Address: Street, City, State, ZIP
        iii. PSS_ID
    b. Data submitted by schools via specially designed Web site. There was no new data submitted after September 2011. Data collected included same fields listed above for Local Governmental organizations. Total number of Public and Private schools submitting information was 796.
    c. Data from the USAC eRate program was not used in this submission.
2. Merged NCES private school with data collected from private schools via our hosted Web site to merge address and ID information with speed information (SubmittedPrivateSchool_Process.arroyo and PrivateSchool_Process.arroyo).
    a. Performed exact match between NCES and submitted data on institution name and zip code
        i. Facilitated matching by:
            1. Converting school names to upper case
            2. Removing string , NJ
            3. Converting string SAINT to ST
    b. For those submitted data entries that did not match NCES data, performed an approximate match based on institution name

i. Preprocess prior to approximate match involved
    1. Replacing string SCHOO or SCHO with SCHOOL
    2. Replacing string HIGH SCHOOL with HS and string ELEMENTARY with ELEM
    3. Removing strings SCHOOL, THE, REGIONAL, HIGH, ACADEMY and ACA
    4. Trimming excess spaces
ii. Matched using Levenshtein Distance metric with threshold of 3.

c. Successfully merged data from submitted private school into NCES institutions
    i. Manual comparison resulted in matching of additional institutions
    ii. Remaining institutions were ambiguous or not present in the NCES data.

3. School records were geocoded using the Yahoo geocoder API.
4. Generated 1154 records to submit, of which 57 were merged with submitted broadband data.
    a. Output file is PrivateSchool_GeoMatched.xls

Public K-12 Schools

There were no updates to the broadband data related to public schools in this round.

We obtained the reference list and broadband records for public and charter schools from NJ DOE and geolocation information for public and charter schools from the NJ Geographic Imagery Network (NJGIN) team. NJGIN and NJ DOE provided two sources data that were merged to get the geolocation and NCES ID of the schools.

1. Obtained the following data from the named sources:
    a. List of schools with broadband data provided by NJ DOE (StateOIT_ARRA_Broadband.csv). This table contained records of 2428 schools with the following fields:
        i. School Name
        ii. Combined_Code that comprises of a concatentation of county, district and school.
        iii. WiFi availability
        iv. ISP Provider Name
        v. Technology
        vi. Downstream Speed
        vii. Upstream Speed
    b. Geolocation data for 3784 schools that included public, private and charter schools. The data included the following fields:
        i. School Name
        ii. Address
        iii. Latitude
        iv. Longitude
        v. County Code (2 digits)
        vi. District Code (4 digits)
        vii. School Code (3 digits)
        viii. Type of school – Public, Private or Charter

The last 3 codes were concatenated to get the Combined Code. However, neither this list nor the broadband data contained the NCES ID which is information required by the NTIA. Therefore, a third list provided by the NJ DOE was used to obtain the NCES ID.

c. List of public K-12 and charter schools in New Jersey (NJ SCH EXTRACT.XLSX) from NJ DOE. Table included information on 2641 institutions with the following fields:
    i. Name
    ii. FIPS State Code
    iii. Two codes ID 4 LEA ID (State) and ID 5 School ID (State), that when combined gave the combined ID used by the DOE in identifying schools.
    iv. Two codes ID 1 LEA ID (NCES) and ID 529 School ID (NCES) that when combined give the NCES ID of the school.

    Because information was not available for private schools, the NJ GIN geolocation information was only used for public and charter schools in this submission.

The data from the website and eRATE data were no longer needed in this submission for public schools as the NJ DOE provided all the necessary data providing greater coverage than the other sources.

2. Merged the two data sources listed in items b and c above to get the list of public schools with goelocation and NCES ID (NJ_Schools_Process.arroyo). The key for merging the two lists was the Combined Code used by the NJ DOE that consists of county, district and school codes.
    a. 2464 records were matched between the two lists
    b. Many of the records in the NJ GIN list could not be matched. Of these, the 67 that were public or charter schools were added to the list of schools.
    c. 178 schools were not in the NJ GIN list. Of these, we were able to geocode 155 schools using Yahoo geocoder API.
        i. Ensured no errors were present, that at least on entry was returned and that quality metric was over 75.
        ii. Ensured that state was New Jersey and that city and/or zip value was populated.
        iii. This process yielded a total of 2686 schools with geolocation.
3. The NJ DOE list of schools with broadband data was merged with the list of schools generated in step 2. The two lists were merged using the Combined Code as the key (Schools_NJDOE_Merge.arroyo). 2421 of the 2428 NJ DOE records were matched.

    Output file is PublicSchools_GeoMatched.xls. It has a total of 2686 schools, 2421 with broadband data.

Public Safety Organizations

The procedure and data in this section are unchanged from the previous submission.

1. Obtained the following data from the named sources:
    a. List of local and state public safety organizations obtained from NJ State 911 Commission. (Reused data from April 2011 - PSAP's & PSDP's_Geocoded.xls) Table included information on 343 institutions with the following fields:

i. Name
ii. Address: Street, City, State, ZIP, County
iii. NCES_ID

b. Data submitted by 120 public safety organizations via specially designed Web site. Data collected included same fields listed above for Local Governmental organizations

2. Generated on 911 Commission Data Latitude and Longitude via geo-coding using Yahoo geocoder API.
    a. Ensured no errors were present, that at least on entry was returned and that quality metric was over 75.
3. Merged 911 Commission data with PSAP data collected from via our hosted Web site (120 entries) to merge address and ID information with speed information.
    a. Performed exact match between 911 and submitted data on institution name
        i. Facilitated matching by:
            1. Converting names to upper case
            2. Removing the Strings DEPARTMENT, DEPT, TOWNSHIP, TWP
            3. Removing punctuation and double-spaces
            4. Replacing string PD with POLICE and string BOROUGH with BORO
    b. Performed manual merging to integrate additional submitted records that were not matched.
        i. Successfully merged 85 submitted PSAP entries with 911 Commission data.

    Output in file PSAP_911_Matched.xls

Additional CAI Processing

All of the CAI data were put through additional processing and validation that achieved the following:

a. Extracted the building number from the street address
b. Checked and verified that all records had a 5 digit zip code
c. Verified that the city name was not null
d. Eliminated records that had only PO Boxes for their street addresses
e. Verified that all the records were in New Jersey
f. Removed duplicate entries. CAIs with service from multiple providers were listed multiple times in order to capture the technology and speeds for each provider.
g. For records that had broadband service, if the downstream speed or upstream speed were missing or “0”, they were changed to “ZZ”, the default value for speed in the data model.
h. Checked if the downstream speed was greater than or equal to the upstream speed. There were 176 records where this failed. In these cases, the upstream speed was made equal to the downstream speed in the submitted records.
i. Checked if the upstream and downstream speeds were equal where the technology was identified as Symmetric DSL. If the check failed, the technology was set to -9999, the default value for technology in the data model and the upstream and downstream speeds were set to “ZZ”, the default value for speed in the data model.

j. Checked if the downstream speed was in the allowed range for the given technology as defined by the NTIA. If it did not, the speed was set to “ZZ”.
k. Checked if the upstream speed was in the allowed range for the given technology as defined by the NTIA. If it did not, the speed was set to “ZZ”.
l. If both the downstream and upstream speeds did not match the technology, then the technology was set to -9999 and the speeds were set to “ZZ”.

The validation checks from *h* to *l* in the list resulted in changes to 406 CAI records where one or more of technology or speed were changed.

This processing also resulted in elimination of some records and yielded the final count of submitted records as shown in Table 1.

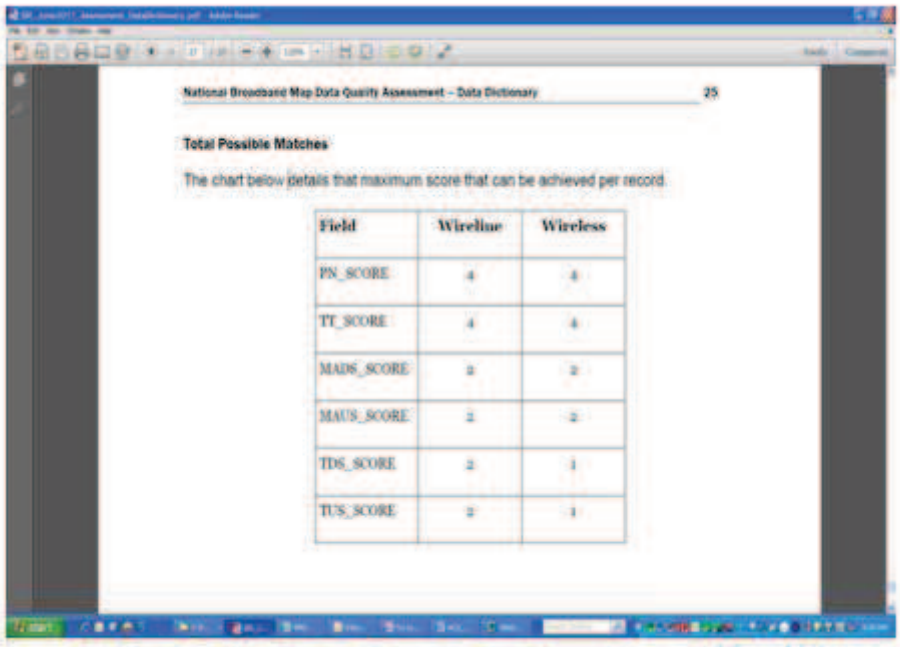
Appendix C: Third-Party Comparisons

NJ June 2011 Assessment Summary

- Based on government provided assessment that used data from third party sources for comparison
  - Appears that there were 4 sources, not all provided all the data
  - Data dictionary indicates max possible comparisons for each field (slide 3)
  - Note that even within these, the number of available data sources were lower for some records
- Database overview:
  - New fields appended to submitted datasets (BB_Service_Address, BB_Service_CensusBlock, BB_Service_RoadSegment)
    - PN_SCORE (provider name comparison score)
    - TT_SCORE (transtech comparison score)
    - MADS_SCORE (Max adv upstream tier comparison score)
    - MAUS_SCORE (Max adv downstream tier comparison score)
    - TDS_SCORE (Typical upstream tier comparison score)
    - TUS_SCORE (Typical downstream tier comparison score)
  - Score field values
    - 0 – no match
    - 1 to 4 – number of matches
    - 7 – un-scored record (no analytics)
  - Comparison data is not provided – only resulting match or no match
  - When PN_M_COUNT=0, TT_T_COUNT, MADS_T_COUNT, MAUS_T_COUNT are set to 0

Notes on Comparison Data

- Summary tables of unmatched records in NJ_June2011_Summary.pdf cover both wireline and wireless
- Wireless_by_Block table gives the wireless data by census block (2010 Census blocks)
- Wireless results include the number of comparison datapoints available for each element
  - *_M_COUNT: number of matches in our data, e.g. TT_M_COUNT
  - *_T_COUNT: number of possible matches, i.e. number of comparisons that were made for each field, upper bound of achievable score for each record, e.g. TT_T_COUNT
- Issues with comparison analysis results
  1. Wireline data does not include number of available comparison values, i.e. upper bound on achievable score for each record
  2. With wireless, where upper bound is provided, how to interpret results where we achieved a score > 0 but less than the bound – appears that reference datasets were not aligned
  3. Database only provides number of mismatches - No way of telling which providers overstated their speed vs understated



National Broadband Map Data Quality Assessment – Data Dictionary 25

Total Possible Matches

The chart below details that maximum score that can be achieved per record.

Field	Wireline	Wireless
PN_SCORE	4	4
TT_SCORE	4	4
MADS_SCORE	2	2
MAUS_SCORE	2	2
TDS_SCORE	2	1
TUS_SCORE	2	1

BB_Service_CensusBlock Comparison Summary

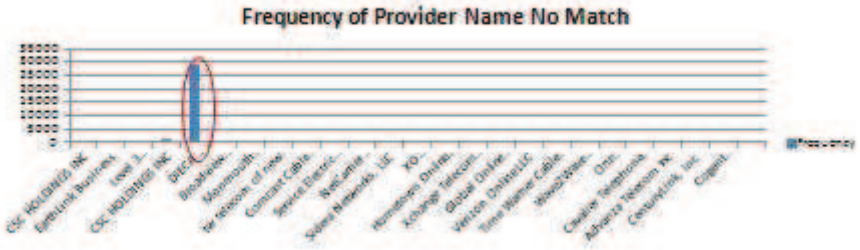
Total records - 525296

Field	Score=4	Score=0	Score < 4	Score =7
Provider Name	4142	32645	521152	2
Trans Tech	3797	94854	521497	2
Max Adv Down	0[1]	317278	525294	2
Max Adv Up	0[1]	248281	525294	2
Typical Down				
Typical Up				

[1] Score of 4 is not possible for this element

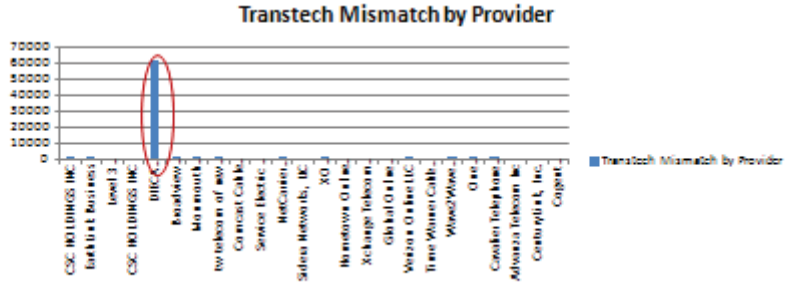
Provider Name No Match

PN_SCORE=0
BB_Service_CensusBlock

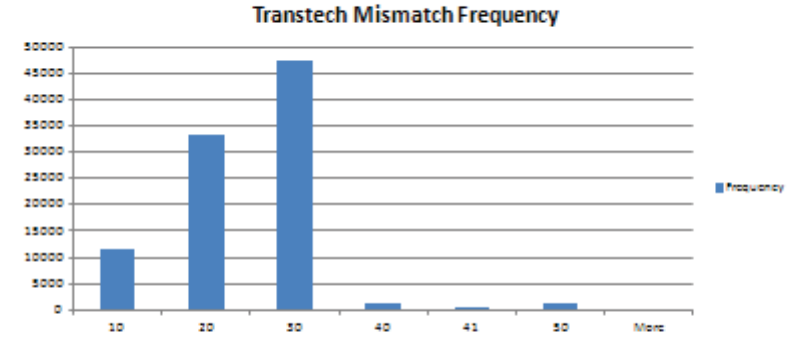


Transtech No Match

- Analyzed db BB_Service_CensusBlock
- Transtech mismatches are counted only for the cases where provider name matched
- TT_SCORE=0 when PN_SCORE>0
- Again DIECA has the most mismatches



Transtech Mismatch by TT Type

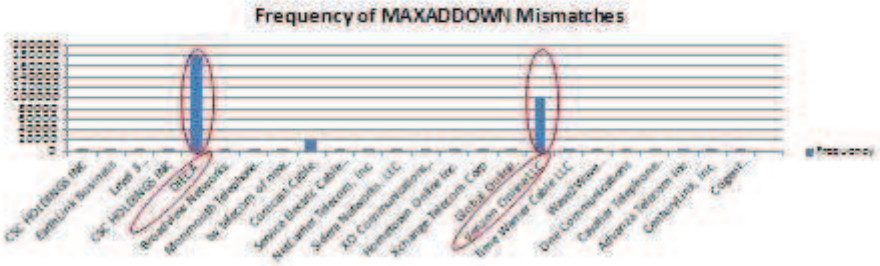


TT_SCORE=0
BB_Service_CensusBlock

Transtech Code	Meaning
10	ADSL
20	SDSL
30	Other Copper
40	Cable Model DOCSIS 3.0
41	Cable Model - Other
50	Optical Fibre

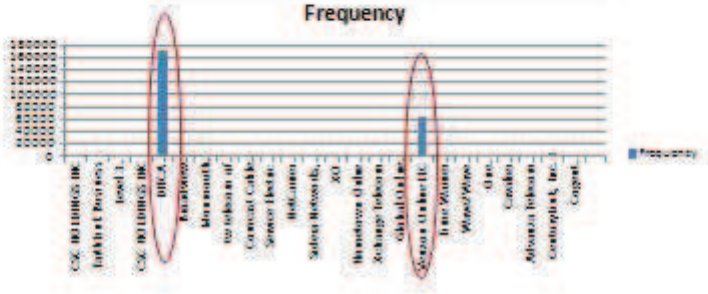
Max Adv Down Mismatch

MADS_SCORE=0
BB_Service_CensusBlock



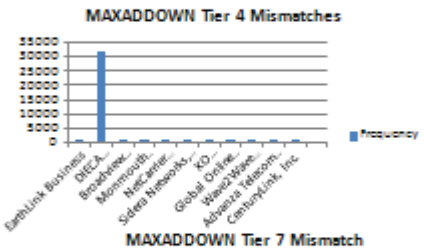
Max Adv Up Mismatch

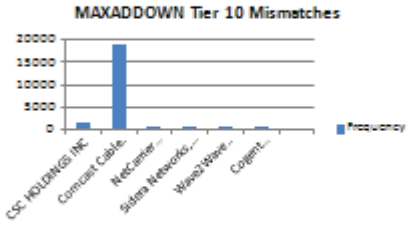
MAUS_SCORE=0
BB_Service_CensusBlock

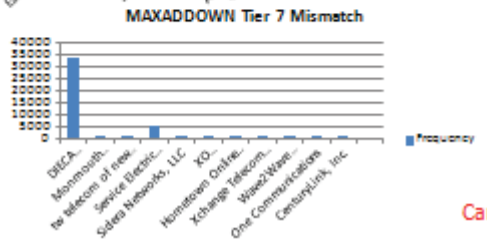


MAXADDOWN Non-Green Tiers

- Assessment summary report showed that Tiers 4, 7 and 10 had the most mismatches of concern (NJ reported tier > comparison data, yellow, orange or red)





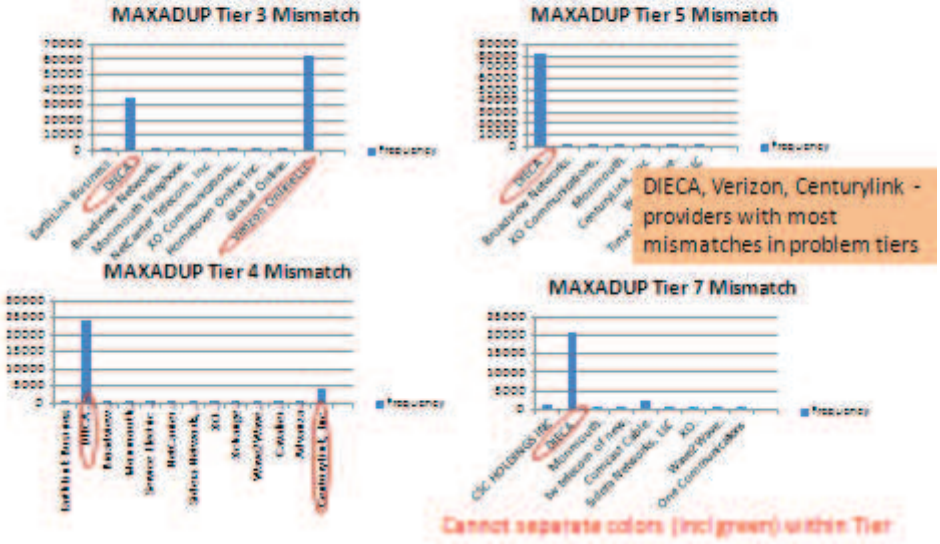


DIECA, Service Electric, Comcast Cable - providers with most mismatches in problem tiers

Cannot separate colors (incl green) within Tier

MAXADUP Non-Green Tiers

- Assessment summary report showed that Tiers 3, 4, 5 and 7 had the most mismatches of concern (NJ reported tier > comparison data, yellow, orange or red)



Wireline Stats for Some Providers

BB_Service_CensusBlock analysis
TT_SCORE column values are after eliminating PN_SCORE=0
MADS_SCORE and MAUS_SCORE after eliminating TT_SCORE=0

Provider	Total Records	PN_SCORE=0	TT_SCORE=0	MADS_SCORE=0	MAUS_SCORE=0
Comcast	62834	0	34	19002	2241
CSC Holdings	60904	1332	759	0	0
DIECA	219164	29275	60992	93674	79684
Verizon Online	159874	18	336	100069	62493

Wireless Statistics

Element	Total Records	M_COUNT < T_COUNT	M_COUNT=0
PN	1596895	461022	446887
TT	1596895	78625	19
MADS	1596895	676290	669260
MAUS	1596895	338917	338917

Wireless Statistics by Provider

	Total Records	PN_M_COUNT=0	TT_M_COUNT=0	MADS_M_COUNT *	MAUS_M_COUNT *
Hughes	169588	126880	0	10215	754
AT&T	167813	0	0	167813	48
Leap Wireless	52217	19	0	493	493
Cellco (Verizon)	254289	0	19	171008	171008
Clearwire	65567	3	0	65564	0
Global Online Electronic Services	1	1	0	0	0
Sprint Nextel	173048	0	0	107521	107521
StarBand	169588	169191	0	124	0
TMobile	375091	1057	0	232137	144708
Wave2Wave	105	12	0	52	52
WildBlue	169588	149724	0	0	0

* After eliminating records with provider name mismatches

Hughes

- All PN_M_COUNT=0 records were associated with PN_T_COUNT=1
  - Only one data source was available for comparison in the affected census blocks

Wireless Statistics

	MADS Speed Tier	MAUS Speed Tier
Hughes	4	2
AT&T	4	3
Cellco (Verizon)	6 5	5 4
Clearwire	5	3
Sprint Nextel	3	2
T Mobile	7 6 4	4 4 2

Transtech Mismatch Count

Wireless & Satellite

Transtech=80 TT_M_COUNT < TT_T_COUNT	Transtech=70 TT_M_COUNT < TT_T_COUNT	Transtech=60 TT_M_COUNT < TT_T_COUNT	Transtech=50 TT_SCORE < PN_SCORE	Transtech=30 TT_SCORE < PN_SCORE	Transtech=20 TT_SCORE < PN_SCORE	Transtech=10 TT_SCORE < PN_SCORE
Terrestrial Mobile Wireless	Terrestrial Fixed Wireless - Unlicensed	Satellite	Fibre	Other Copper	SDSL	ADSL
78625	0	0	12012	29311	27881	12737
78625	0	0	14585	29550	27882	12749

- Numbers in second row in table are obtained from querying GDB (wireless and wireline) for each Transtech code
- Numbers in the bottom row are from NTIA's table "Un-matched Technology Of Transmission Records"
- Wireless numbers match what's in NTIA's table exactly
- Wireline numbers are off by varying degrees, most are close except Transtech=50
- Note: Transtech table counts all mismatches, for all the comparison datasets, not enough to have one match
  - Wireless database provides the target count and so is easy to get
  - For wireline ended up using PN_SCORE as indirect measure of target set for each record – possible cause of deviation

Verizon Wireless Transtech Comparison

- All transtech mismatches in wireless are only in Transtech=80 (Wireless mobile)
  - total 78625 records
- All are for Cellco Partnership (Verizon)
- Our data has it as Transtech =80, their comparison data has them spread across Transtech=10, 20, 30 and 50! (all wireline transtech codes)
- All of these are records where provider name had no mismatch
- Issue: If provider name matched to Cellco Partnership (uniquely wireless provider) how could the reference transtech codes be in the wireline space?

Analysis of Discrepancies between December 2011 Submission and Third-Party Data

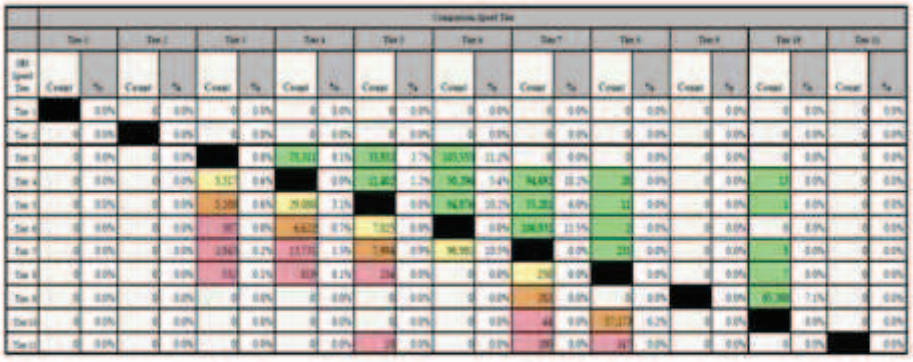
What's New?

To improve the usefulness of the Awardee file geodatabase, the following changes have been made to the format that was presented in the June 2011 SBI version of the Awardee file geodatabase:

1. The file geodatabase contains data current as of December 31, 2011.
2. Scores for BB_Service_RoadSegment are now shown at the Census Block level. This will provide the Awardee with a better understanding of the scoring for road segments that traverse multiple Census Blocks.
   a. The census block level scoring is contained in a new table named RoadSegment_by_Block.
   b. The RoadSegment_by_Block table can be queried similar to the Wireless_by_Block table as described in the *How to Query Road Segment and Wireless Records* section of this document.
   c. The following fields have been dropped from BB_Service_RoadSegment
      i. PN_SCORE
      ii. TT_SCORE
      iii. MADS_SCORE
      iv. MAUS_SCORE
      v. TDS_SCORE
      vi. TUS_SCORE
3. The following field names in the Wireless_by_block and RoadSegment_by_Block tables have been added or updated to better reflect the original SBI field names:
   a. PROVNAME (updated)
   b. DBANAME (added)
   c. FRN (added)
   d. TRANSTECH (updated)
   e. MAXADDOWN (added)
   f. MAXADUP (added)
   g. TYPICDOWN (added)
   h. TYPICUP (added)

Dec 2011 Umatched MADS

Un-matched Maximum Advertised Downstream Records



- 926133 mismatches (mismatch for each source is counted separately)
- Only ~25% of these are non-green (15% yellow, 8% orange and 2% red)
- Tiers 5, 7 and 10 have most non-green mismatches
- Biggest differences from June 2011 are in the green cells

Dec 2011 Umatched MAUS

======Un-matched Maximum Advertised Upstream Records======

	Comparison Speed Tier																			
	Tier 1		Tier 2		Tier 3		Tier 4		Tier 5		Tier 6		Tier 7		Tier 8		Tier 9		Tier 10		Tier 11	
SBI Speed Tier	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Tier 1		0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Tier 2	0	0.0%		0.0%	136,890	24.3%	126,851	22.5%	103,378	18.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Tier 3	0	0.0%	15,596	2.8%		0.0%	268	0.0%	68	0.0%	10	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Tier 4	0	0.0%	797	0.1%	15,521	2.8%		0.0%	494	0.1%	34	0.0%	29	0.0%	28	0.0%	0	0.0%	13	0.0%	0	0.0%
Tier 5	0	0.0%	0	0.0%	5,106	0.9%	24,316	4.3%		0.0%	10	0.0%	5	0.0%	11	0.0%	0	0.0%	1	0.0%	0	0.0%
Tier 6	0	0.0%	0	0.0%	387	0.1%	101	0.0%	16	0.0%		0.0%	0	0.0%	2	0.0%	0	0.0%	0	0.0%	0	0.0%
Tier 7	0	0.0%	0	0.0%	2,043	0.4%	8,791	1.6%	12,998	2.3%	405	0.1%		0.0%	104,348	18.5%	0	0.0%	3,433	0.6%	0	0.0%
Tier 8	0	0.0%	0	0.0%	532	0.1%	819	0.1%	234	0.0%	9	0.0%	0	0.0%		0.0%	0	0.0%	7	0.0%	0	0.0%
Tier 9	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%		0.0%	13	0.0%	0	0.0%
Tier 10	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%		0.0%	0	0.0%
Tier 11	0	0.0%	0	0.0%	0	0.0%	0	0.0%	10	0.0%	0	0.0%	200	0.0%	347	0.1%	0	0.0%	0	0.0%		0.0%

- 546112 mismatches total (mismatch for each source is counted separately)
- Only 15.6% are non-green (9.9% yellow, 3.4% orange and 2.4% red)
- Tiers 3, 4, 5 and 7 have the most non-green mismatches

Dec 2011 Transtech Mismatches

======Un-matched Technology of Transmission Records======

	Comparison TRANSTECH																			
	10		20		30		40		41		50		60		70		71		80		90	
SBI TRANSTECH	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
10	0	0.0%	1,353	0.9%	9,652	6.1%	58	0.0%	0	0.0%	4,777	3.0%	0	0.0%	0	0.0%	0	0.0%	5,709	3.6%	0	0.0%
20	22,287	14.1%	0	0.0%	7,589	4.8%	4	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
30	26,511	16.8%	4,950	3.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
40	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	407	0.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
41	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
50	10,249	6.5%	0	0.0%	2,926	1.9%	1,873	1.2%	520	0.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	3,962	2.5%	0	0.0%
60	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
70	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
71	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
80	26,346	16.7%	0	0.0%	13,994	8.9%	0	0.0%	0	0.0%	14,066	9.4%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
90	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

- 158027 mismatches total (includes wireline and wireless)
- All mismatches are in transtech codes 20, 30, 50 and 80
- Queries on the GDB indicate that these results are obtained by the query 'TT_M_COUNT < TT_T_COUNT and PN_M_COUNT>0'
  - Wireless records have insignificant number of TT mismatches where TT_M_COUNT=0

Overview of Mismatches in Wireline Records

Dec 2011 Data - Total Records in Wireline Census Block gdb: 528401

Field	Score=4	Score=2	Score=0	Score < 4	Score < 2	Score =7
Provider Name	4120		43078	524279		2 (Netlogic)
Trans Tech	3507		68062	481814		2
Max Adv Down		64990	313906		463409	2
Max Adv Up		139643	271564		388756	2

June 2011 Data - Total records: 525296

Field	Score=4	Score=0	Score < 4	Score =7
Provider Name	4142	32645	521152	2
Trans Tech	3797	94854	521497	2
Max Adv Down	0 [1]	317278	525294	2
Max Adv Up	0[1]	248281	525294	2

Mismatches have changed slightly since the previous assessment

PN_SCORE = 0

Provider Name	Frequency
CSC HOLDINGS INC	18
EarthLink Business	525
Level 3 Communications, LLC	158
CSC HOLDINGS INC	965
DIECA Communications, Inc.	59557
Monmouth Telephone & Telegraph	109
tw telecom of new jersey	2
Comcast Cable Communications, LLC	55
Service Electric Cable TV of NJ Inc.	468
NetCentrix Telecom, Inc.	88
XO Communications, LLC	400
Hometown Online Inc.	6
Xchange Telecom Corp	358
Global Online Electronic Services, Inc.	4
Verizon Online LLC	291
Advanse Telecom Inc	12

TT_SCORE = 0 /PN_SCORE ≠ 0

Provider	Frequency
CSC HOLDINGS INC	224
Level 3 Communications, LLC	26
CSC HOLDINGS INC	92
DIECA Communications, Inc.	66403
Monmouth Telephone & Telegraph	9
tw telecom of new jersey	1
NetCarrier Telecom, Inc.	10
XO Communications, LLC	23
Hometown Online Inc.	4
Xchange Telecom Corp	44
Verizon Online LLC	1206
Advanza Telecom Inc	20

TT	Frequency
10	6181
20	29810
30	31280
40	92
50	699

Transtech Code	Meaning
10	ADSL
20	SDSL
30	Other Copper
40	Cable Modem DOCSIS 3.0
41	Cable Modem - Other
50	Optical Fibre

Not much of a difference from June 2011

MADS_SCORE=0/TT_SCORE ≠ 0

Provider	Frequency
CSC HOLDINGS INC	417
CSC HOLDINGS INC	5
DIECA Communications, Inc.	85590
Monmouth Telephone & Telegraph	242
tw telecom of new jersey	16
Comcast Cable Communications, LLC	19290
Service Electric Cable TV of NJ Inc.	166
NetCarrier Telecom, Inc.	30
XO Communications, LLC	225
Hometown Online Inc.	281
Xchange Telecom Corp	346
Verizon Online LLC	96113
Time Warner Cable LLC	7
CenturyLink, Inc.	38

Max Adv Down	Frequency
3	1236
4	19770
5	84731
6	29160
7	27664
8	1758
9	18734
10	19295
11	418

MAUS_SCORE=0/TT_SCORE ≠ 0

Provider	Frequency
CSC HOLDINGS INC	417
CSC HOLDINGS INC	5
DIECA Communications, Inc.	71894
Monmouth Telephone & Telegraph	242
Nj telecom of new jersey	16
Comcast Cable Communications, LLC	2783
Service Electric Cable TV of NJ Inc.	166
NetCarrier Telecom, Inc.	11
XO Communications, LLC	225
Hometown Online Inc.	54
Xchange Telecom Corp	309
Verizon Online LLC	77366
Time Warner Cable LLC	7
CenturyLink, Inc.	6929

Max Adv Up Tier	Frequency
2	20015
3	19362
4	10941
5	29196
6	506
7	78381
8	1592
9	13
11	418

Wireline Stats by Provider

Dec 2011 Assessment

TT_SCORE values are after eliminating PN_SCORE=0
MADS_SCORE and MAUS_SCORE after eliminating TT_SCORE=0

Provider	Total Records	PN_SCORE=0	TT_SCORE=0	MADS_SCORE=0	MAUS_SCORE=0
Comcast	66069	35	0	19290	2783
CSC Holdings	62501	983	316	422	422
DIECA	219164	39857	66403	85590	71894
Verizon Online	160123	291	1206	96113	77366

June 2011 Assessment

Provider	Total Records	PN_SCORE=0	TT_SCORE=0	MADS_SCORE=0	MAUS_SCORE=0
Comcast	62834	0	34	19002	2241
CSC Holdings	60904	1332	759	0	0
DIECA	219164	29275	60992	93674	79684
Verizon Online	159874	18	336	100069	62493

Dieca Focused Analysis - 1

Provider Name (Mis)Matches

Total Records	PN_SCORE>2	PN_SCORE=2	PN_SCORE=1	PN_SCORE=0
219314	0	68	179389	39857

Transtech (Mis)Matches

Total Records	TT_SCORE>2	TT_SCORE=2	TT_SCORE=1	TT_SCORE=0
219314	0	45	113009	66403

Transtech Mismatch Distribution

Transtech	# records	TT_SCORE=0
10	66260	5366
20	54920	29786
30	98134	31251

Dieca has very few records that match more than one source

Dieca Focused Analysis - 2

MADS Tier	# Records	# Mismatch
3	10387	1085
4	36914	6258
5	101557	35949
6	24517	13760
7	43216	26958
8	2723	1580

MAUS Tier	# Records	# Mismatch
2	23477	6733
3	51513	15777
4	24746	3473
5	87900	28965
6	1315	499
7	27640	14867
8	2723	1580

Verizon Focused Analysis - 1

Provider Name (Mis)Matches

Total Records	PN_SCORE=4	PN_SCORE=3	PN_SCORE=2	PN_SCORE=1	PN_SCORE=0
160123	2964	104545	45293	7030	291

Transtech (Mis)Matches

Total Records	TT_SCORE=4	TT_SCORE=3	TT_SCORE=2	TT_SCORE=1	TT_SCORE=0
160123	2351	83343	58176	14756	1206

Transtech Mismatch Distribution

Transtech	# records	TT_SCORE=0
10	98818	767
50	61305	439

Verizon Focused Analysis - 2

MADS Tier	# Records	# Mismatch	Transtech Code
4	13469	13282	All are 10
5	63580	48723	All are 10
6	21769	15393	All are 10
9	61305	18714	All are 50

MAUS Tier	# Records	# Mismatch	Transtech Code
2	13469	13282	All are 10
3	85349	3453	All are 10
7	61305	60631	All are 50

High percentage of Verizon records have speed mismatches

Comcast Focused Analysis - 1

Provider Name (Mis)Matches

Total Records	PN_SCORE=4	PN_SCORE=3	PN_SCORE=2	PN_SCORE=1	PN_SCORE=0
66069	1057	38963	24106	1908	35

Transtech (Mis)Matches

Total Records	TT_SCORE=4	TT_SCORE=3	TT_SCORE=2	TT_SCORE=1	TT_SCORE=0
66069	1057	38963	24106	1908	0

Comcast Focused Analysis - 2

MADS Tier	# Records	# Mismatch	Transtech Code
10	66069	19290	All are 40

MAUS Tier	# Records	# Mismatch	Transtech Code
7	66069	2783	All are 40

Comcast has only one MADS tier of 10 and one MAUS tier of 7 in our data

Wireless Statistics

Dec 2011 Assessment

Element	Total Records	M_COUNT < T_COUNT	M_COUNT=0
PN	1618164	472647	472647
TT	1618164	55206	10
MADS	1618164	583402	583402 (702494)
MAUS	1618164	339424	339424 (458516)

June 2011 Assessment

Element	Total Records	M_COUNT < T_COUNT	M_COUNT=0
PN	1596895	461022	446887
TT	1596895	78625	19
MADS	1596895	676290	669260
MAUS	1596895	338917	338917

Wireless Provider Name Mismatches by Provider

Provider	Total Records	PN_M_COUNT=0
Leap Wireless International, Inc.	52359	630
Cellco Partnership	256988	8
StarBand Communications Inc.	169588	169237
T-Mobile USA, Inc.	384706	1204
WildBlue Communications, Inc.	169588	153749
Jersey Shore Wireless	5702	3352
Hughes Network Systems, LLC	168588	144465
Clearwire Corporation	66463	2

All 3 with poor PN matching are satellite providers, Transtech = 60

Wireless – MADS and MAUS Mismatches

Provider	Total Records	MADS_M_COUNT=0	MAUS_M_COUNT=0
Cellco Partnership	256988	191450	103378
Sprint Nextel Corporation	174583	108140	108140
StarBand Communications Inc.	169588	124	0
T-Mobile USA, Inc.	384706	210657	127574
Global Online Electronic Services, Inc.	1	1	1
Hughes Network Systems, LLC	168588	6569	331
Clearwire Corporation	66463	66461	0

*Cellco (Verizon), Sprint Nextel and T-Mobile have the most mismatches
* Cellco, T-Mobile, AT&T and others have a large number of records where MADS_T_COUNT =0 or MAUS_T_COUNT=0 (not included in the table)
* Numbers in the table are a result of the query
MADS_M_COUNT = 0 and MADS_M_COUNT<MADS_T_COUNT and TT_M_COUNT>0

Cellco Partnership (Verizon) Analysis

MADS Speed Tier	# Records	# Mismatches	Transtech Code
3	168903	103378	All are 80
7	88085	88072	All are 80

MAUS Speed Tier	# Records	# Mismatches	Transtech Code
2	168903	103378	All are 80
5	88085	0	All are 80

Sprint Nextel Analysis

MADS Speed Tier	# Records	# Mismatches	Transtech Code
3	108160	108140	All are 80
5	66423	0	All are 80

MAUS Speed Tier	# Records	# Mismatches	Transtech Code
2	108160	108140	All are 80
3	66423	0	All are 80

- Sprint has significant mismatches, but only in the lowest tier
- Sprint is not overstating speeds

T-Mobile Analysis

MADS Speed Tier	# Records	# Mismatches	Transtech Code
4	154225	126851	All are 80
6	132784	78587	All are 80
7	97697	5219	All are 80

MAUS Speed Tier	# Records	# Mismatches	Transtech Code
2	154225	126851	All are 80
4	230481	723	All are 80

Questions to Resolve Discrepancies with FCC

The six questions below (in italics) were reviewed on August 21, 2012 in a teleconference call involving ACS, NJ OIT, FCC and Michael Baker personnel. FCC responses are provided for each question.

1. *By far, the bulk of mismatches in the wireline data were from a single provider - Dieca Communications DBA Covad Communications - and in all the comparison fields. Deica/Covad has merged with Megapath and has subsequently explained to us that they provide facilities-based services which are then branded and sold by others. We would be interested in any information NTIA can provide on what FRN or names are being compared against Deica's data.*
   Provider names and FRNs are compared to Form 477 data to perform location matches. Mismatches often result from errors in the Form 477 data. Moreover, mismatches aren't often valid for MVN data.

2. *All transtech code mismatches in the wireless data were found to be associated with the provider called "Cellco Partnership" with DBA name of Verizon Wireless. NJ's submitted data has the transtech code of 80 that corresponds to "Wireless Mobile". From the Transtech mismatch table in the summary report, it appears that this data was being compared against records with transtech codes spanning across values in the wireline space. Can you confirm or correct our understanding, and, if this is a case of comparing wireless data against wired records, please advise as to how to correct?*

   With the Form 477 data, sometimes different services are grouped under the same FRN, e.g., data for DSL and "other copper" may be confounded. The problem is likely in the third-party data, so we can ignore these discrepancies.

3. *The bulk of provider name mismatches in wireless data came from satellite providers - Hughes, WildBlue and Starband. In addition, about 87% of the satellite provider records (445795 out of 508674) had provider name mismatches.Additional information on what they were compared against is needed to better understand the reason for this.*
   This problem likely has the same explanation as 1 above.

Finally, ACS would like to get clarification on the following aspects in order to help us in our analysis and interpretation:

4. *The wireless data include the number of sources that were available for comparison for each record and each compared element (T_COUNT).This helps in determining the true number of mismatches. However, the wireline data do not include such information and just include the score, without any indication of how many comparison sources were used. So, it is not clear if a score of 1 indicates a full match to a single available data source or only a match to a subset of sources.*
   NTIA will look into this issue for the Oct. 20012 submission.

5. *In the case of wireless, how should we interpret cases where M_COUNT 0 (indicating at least one match) but the M_COUNT < T_COUNT? This implies that the comparison sources were not in agreement.*

This probably isn't a problem with the data submission. This happens more often in the wireless domain. One of the third party data sources used for wireless comparisons is FCC speed tests, which often have fewer records and the census block coverage is uneven.

6. *The summary results indicate by color code (grades from green to red) the amount by which the submitted data overstated the speed tier in comparison with the third party sources. However, it is not clear how to correlate this to specific providers because the geodatabase only indicates that a mismatch exists but does not indicate the comparison values of the speed tiers. Can you provide provider-specific color-coded data?*
   This problem is recognized and is already in the "NTIA court," i.e., is under consideration.

Appendix D: Data Confidence Scale White Paper

Author: D E Duffy November 16, 2012

Approach to Data Confidence Scales

1. Background

Our objective in developing a data confidence scale is to begin to capture an estimation of the underlying confidence we have in the data elements of our submission. Among the major underlying factors that impact the data quality and, hence, the confidence, are the following three.

- Source
  Different data sources vary in their intrinsic accuracy, inherent biases, and their level of granularity and precision of detail. For example, NJEDge provides broadband services to New Jersey colleges, universities and research institutions. NJEDge is a non-profit technology consortium responsible for the NJEDge.Net infrastructure. NJEDge has highly accurate information on the broadband capability they are delivering to their member institutions via the NJEDge.Net. Their CAI data has intrinsically high accuracy and is not subject to inherent biases.
  As another example, commercial service providers vary widely in their support of this program and in their data quality. In general, there may be an inherent bias built into the program for commercial service providers to err on the side of overstating their coverage and speeds. For some providers, we will have some knowledge about how -- and how carefully -- they produce the data based upon our interactions with them and their staff. Most of the large providers have repeatable processes in which coverage data is re-generated every half year by contractor personnel. For these providers, the basic data on their serving areas and types of service is of high accuracy. For a couple of small providers, we have resorted to gleaning their coverage area from their web pages because they did not have the resources to provide data to us; this yields data of lower intrinsic accuracy.
  We have satellite providers who have submitted data that essentially states, “We serve the entire state with high speed service.” Such satellite data is given to us at a crude level, with the largest possibly granularity (namely the entire state), and clearly subject to overstatement bias. Hence it is intrinsically of lower quality and we have less confidence in it.
  As yet another example, consider the DOE data which was collected by surveying schools. For such data, the quality would be expected to vary based on the knowledge of the individual completing the survey for a given school as well as the priority and attention given to survey completion which may differ in different schools, districts, etc. We conducted a quality review of the DOE data and our analysis supports this by identifying schools and groups of schools with missing or anomalous data elements. More specifically, a small subset of schools has been flagged for inconsistency issues such as up-speed greater than down-speed, or transmission technology incompatible with stated provider.

- Currency, that is, the property of being up-to-date
  One of the ongoing challenges in this project is getting data sources to carefully vet their data every 6 months. Some service providers use automatic methods in which their data is re-generated for each half-yearly cycle. Some providers merely send us an email stating that their data has not changed since their previous submission. Some other providers are inconsistently available -- they may provide data for one round and then be nonresponsive in the next round leaving us the choice to re-use the previous data or drop them from the submission. Absent evidence that such a provider has gone out of business or discontinued service, it is our general view that in most cases greater accuracy is achieved by reusing the previous submission with clear documentation in our methodology report. It is also worth noting that the underlying rates of change are very different for different providers -- some providers are aggressively rolling out new capability or growing rapidly, while others have a small, stable customer base and may serve just a handful of specific customer locations in the state. For CAI data, the challenges in data currency are often great as we may receive a one-time submission of information through our website, never receive any updates to the information, and have no effective means of soliciting updated data.

- Verification
  We use a wide variety of techniques for validation and verification of the data we collect. These techniques are discussed in detail in our methodology report and a listing of them is provided in Section 4 of this memo. The techniques vary from simply reviews for missing or incorrect data to more complex business rules and comparisons, including the 3rd party data comparison summaries we receive from the NTIA. Separately and together these can serve to strengthen or weaken our confidence in the accuracy of the underlying data. As one example, when we receive data with large numbers of missing or incorrectly-coded values, this is often a sign of broader quality and accuracy problems.
  As a second example, we can compare DOE data records to service provider records – if a school states that is receives service from a specific provider at a certain address, does the provider also report service availability at that location, and of the character and speed which the school reports? In those cases where such data fails to match, we would look further to determine the nature of the mis-match. For example, if there is no match, we would consider whether the school data has already been flagged as questionable due perhaps to one of the other validations we performed. If so, the mis-match would further weaken the confidence in the school data. On the other hand, if the school data record otherwise looks good, we might look at the location in the context of the service provider's footprint to see if there is any geo-spatial indication that the service provider may have omitted a region from their coverage area.
  We have previously conducted thorough reviews and analyses of the 3rd party data comparisons which the NTIA has provided to us. The nature of these 3rd party comparisons is that, in the case of mis-match, it is not possible to identify which of the mis-matching data is correct and which is in error – in other words, a mis-match can essentially be equally likely caused by lack of accuracy in the 3rd party comparison data as in our data. Nonetheless, we find the 3rd party comparisons useful for two main purposes. The first and clearest use is that matching data can serve to provide some

additional incremental confidence in our data. Second, mis-matching data may heighten data quality concerns where they are already present.

We will be developing an initial approach to data confidence which we plan to trial during the first quarter of 2013 as we prepare for the April 1, 2013 deliverable. After this initial trial, we will evaluate the strengths and weaknesses of the data confidence scales and take steps to further develop and refine the approach for use in the October 1, 2013 deliverable. The remainder of this brief memo describes at a high-level our conceptual approach to this initial data confidence scale estimation.

2. Confidence Scale

We propose to use a 9 point scale for estimating data confidence where a value of 5 corresponds to intermediate, 1 corresponds to low quality, and 9 corresponds to high quality. Initially, it is our expectation that we will report only these 5 values: 1 = Low, 3 = Medium-Low, 5 = Intermediate, 7 = Medium-High, and 9 = High. The reason for this is the following: Clearly in this initial trial we are just beginning to roughly categorize the level of confidence. Use of a fine-grained scale for reporting, however, could imply an ability on our part to make fine distinctions in data confidence which is not the case. As we further refine and develop our approach to gauging data confidence, we may or may not have reason to use a finer categorization of confidence and this scale provides the capability to do so. We will also be considering opportunities for automating some of the steps involved in estimating data confidence and, as such, we can envision performing intermediate calculations in which small increments are added or subtracted to the confidence estimate prior to reporting. The use of a numeric scale would naturally support such calculations, in which case the final confidence values would be appropriately rounded for use and reporting.

Data confidence can be estimated at a variety of levels of granularity with respect to the data. For example, for service provider data, we consider a record as the data corresponding to one type of service being provided by a service provider in one census block (CB) (or road segment). The data record will state the transmission technology associated with the service as well as the maximum advertised and typical up speeds and down speeds. Similarly a CAI record consists of the name, location and URL of one CAI along with information on whether the institution has broadband or public WiFi, and the type, up speed and down speed of their broadband connection. One approach would to derive one confidence level estimate for the entire record.

At a finer level of granularity, one could associate a data confidence estimate with each element in the record – that is, for a service provider record, separately estimate confidence for transmission technology, maximum advertised up speed, maximum advertised down speed, typical up speed and typical down speed. There is some logic to this fine-grained approach as the technology and maximum advertised speeds are inherently likely to have greater accuracy than the typical speeds. This logic, however, does not in our view outweigh some of the disadvantages of approaching confidence scales in such a fine-grained fashion, including the sheer volume of confidence estimates that would be required.

At the other extreme, we could provide one estimate of data confidence per service provider or data source. In this large-grained approach we would estimate one overall confidence level for Verizon's 3G service area, one for the NJEDge data, one for the DOE data, etc. Again there is some logic to this large-grained approach as a number of the factors associated with confidence are heavily determined by the source; for example, the process for creating the data, the degree of currency, inherence biases, etc. On the other hand, this approach strikes us as perhaps overly high-level, particularly when we consider CAI data and our validation and verification activities and their results. For these reasons we have decided to approach confidence scale estimation at the record level; that is, we will pursue the objective of estimating a useful data confidence level for service provider records and CAI records.

3. High-Level Confidence Scale Estimation Procedure

The intermediate setting for service provider confidence is a rating of 5.

Service provider ratings may be increased in the following situations:

- Data is kept current; e.g., providers who deliver new data each half year
- Record matches with NTIA 3rd party data comparison data
- Our validation and verification reviews lead to increased confidence; e.g., the record matches with a CAI data record, etc.

Service provider ratings may be decreased in the following situations:

- Data has aged and the nature of the service provider, footprint and technology type are such that changes would be anticipated
- Data has aged and provider was non-responsive to requests for updates
- Data source and data records lead to decreased confidence; e.g., the maximum advertised speeds are at the edge of possibility for the technology, the typical speeds are defined the same as maximum advertised when the technology would not generally deliver that, etc. (Note: These issues may also be flagged via multiple mis-matches with 3rd party comparison data.)
- Validation and verification reviews lead to decreased confidence; e.g., the doughnut hole analysis identifies a specific CB record.

The intermediate setting for CAI confidence is also a rating of 5.

CAI ratings may be increased in the following situations:

- Data source is of intrinsically high quality and kept up-to-date; e.g., NJEDge data.
- Validation and verification reviews lead to increased confidence; e.g., the data record passes all consistency checks and also matches with a service provider record.

CAI records may be decreased in the following situations:

- Data source is not of intrinsically high quality and the data is not up-to-date; e.g., data submitted via website in the past and not updated.

- Data quality review raises questions about data quality; e.g., DOE records with up speed higher than down speed; mismatch of transmission technology and service provider, etc.
- Validation and verification reviews lead to decreased confidence; e.g., the data record does not match the service provider data.

To incorporate our confidence scale, we will need to add an optional numeric field(s) to each record to record the estimated data confidence. This added field will not be included in our delivery to the NTIA, but it will be made available as an option to NJ OIT. NJ OIT can then consider how, if at all, they would like to convey or display the confidence information on the state map. We will similarly add a Data Confidence section to each of our service provider and CAI reports and we will use this section to document the way in which we estimate data confidence for the records associated with that service provider or CAI type.

Our next steps will include selecting a subset of service provider and CAI data from our previous submission (October 1, 2012) and retroactively estimating data confidence according to this approach. We will use this retroactive analysis to adjust the approach before trialing in the next round. As part of the retroactive analysis we will expand the October data model to incorporate the additional field(s) needed to support data confidence estimation and we will also develop procedures to remove this field(s). These procedures will be needed for the data confidence trial.

4. List of Validation and Verification Techniques

1. Verify Provider Name & FRN vs.FCC data by checking the (dbaname, provname, frn)-tuple against our FRN reference table.

2. Verify coverage area and other data elements are within NJ: This verification differs depends on the specific data element and includes checking latitude range, longitude range, valid census block id within NJ, and valid zip code in NJ.

3. Address verification via geo-coding: We use several geo-coding capabilities to verify specific data elements.

4. Validate data in all fields: We review all data elements for uniqueness and validity; i.e., census block ids, TIGERLine street segments, speed tier codes, etc.

5. Technology and speed consistency checks vs. known provider capabilities and/or Web site advertisements. We also review technical specifications from standards.

6. Provider, technology and speed consistency checks for CAI records.

7. Visual inspection of individual provider coverage maps.

8. Data consistency across tables via basic cross-table consistency checks.

9. NTIA validation rule set. We perform all rules in the NTIA check_submission rules; i.e., speed codes versus technology, overview versus detail consistency, etc.

10. Compare cable data to cable franchise municipality data: For cable providers we check coverage areas against municipalities in their franchise area.

11. Survey of 3100 NJ households: Householders who responded that they were broadband users were asked who their service provider was and this data was compared against service provider serving areas for verification.

12. Doughnut hole study, performing self-consistency check of submitted wireline data. Details are found in Methodology report.

13. DOE data: For schools who responded that they had broadband service provided by a certain provider at a specific address, this data was compared against service provider servicing areas for verification.

14. FCC 3rd Party Data Comparisons: Analyze in detail the mis-matches identified in the FCC 3rd party data comparison for specific service providers. Details are in the methodology report.

Appendix E: Data Confidence Assessment

Authors: C. Behrens, S. Erramilli, M. Yu **December 21, 2012**

Data Confidence Assessment

Background

The objective in developing a data confidence scale is to provide an estimation of the underlying confidence we have in the data elements of our submission. The general approach for assessing data confidence was described in an earlier document[1]. Three factors were laid out in that document for determine data confidence – Source, Currency and Verification. The document included a discussion of each factor and recommendations for grading New Jersey's submitted data. This document describes further details of the methodology and the application of the methodology to the most recently submitted data from October 2012. The work described in this document was focused on provider data alone and does not include any assessment of CAI data.

Data Confidence Based on the Source of Data

Service providers have typically submitted their data in a variety of formats. Depending on the format, we have had to translate and transform the data to the format needed by the NTIA, which is an ESRI Shapefile. We have different confidence in the data based on the submitted format, where the less specific and fine-grained information we receive, the lower our confidence in the data. The highest confidence grade is given to providers that submit data as a GIS vector. We used a scale from 1 to 5 where 5 denotes the highest confidence grade. The following is the set of guidelines used in this exercise for assigning a data confidence grade based on **Source** of data:

1 = manual conversion from image to vector, e.g., JPG to SHAPE.
2 = conversion from large polygon to smaller polygon, county to census block.
3 = conversion from street address to census block.
4 = conversion from map coordinates to census block.
5 = data submitted as GIS vectors.

Grades for the data from the 32 providers included in the October 2012 submission are shown in the spreadsheet embedded at the end of this document. The distribution of data confidence grades based on source of data is shown in Figure 1. All of the providers scored better than 1 and were distributed from 2 through 5.

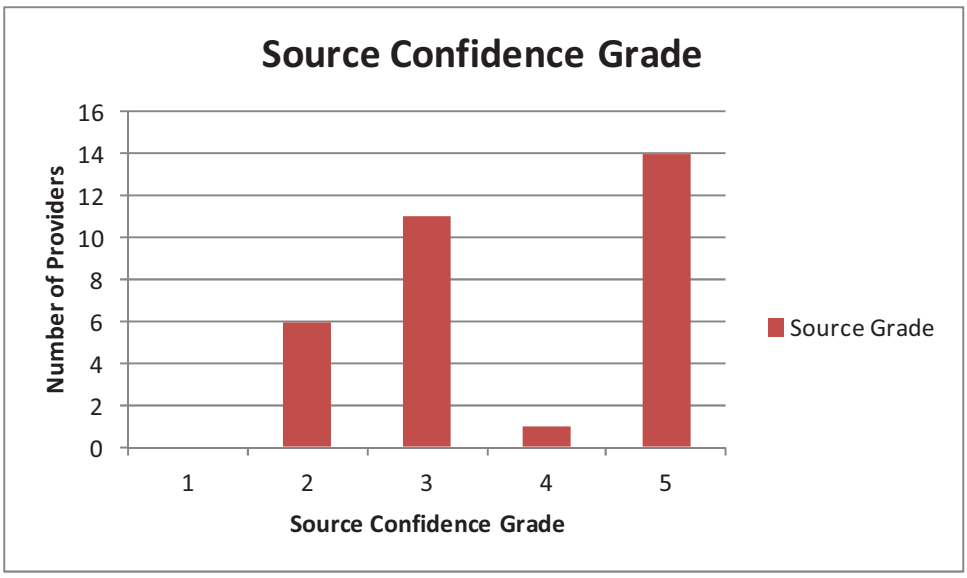


Figure 1 Data Confidence Based on Source

Data Confidence Based on Currency of Data

We also considered data currency, i.e., how up-to-date the data submitted by a provider were, as a measure of data confidence. The older the data, the less confidence we have in its accuracy. We used the following set of rules in assigning a **Currency** grade in the range of 1(lowest) to 5 (highest) to each provider in our October 2012 submission:

1 = data are over a year old, e.g., created in 2010 or early 2011.
2 = data were updated within the last year.
3 = data were updated for the previous submission, but no new response was received from the Service Provider.
4 = data were updated for the previous submission, and the Service Provider responded to our latest request (but without new data).
5 = data were newly updated in response to the latest request.

The list of providers and their grade for Currency is shown in the spreadsheet embedded at the end of this document. Figure 2 shows the distribution of grades across the 32 providers. As can be seen, a majority of the providers obtained high grades for the currency of their data.

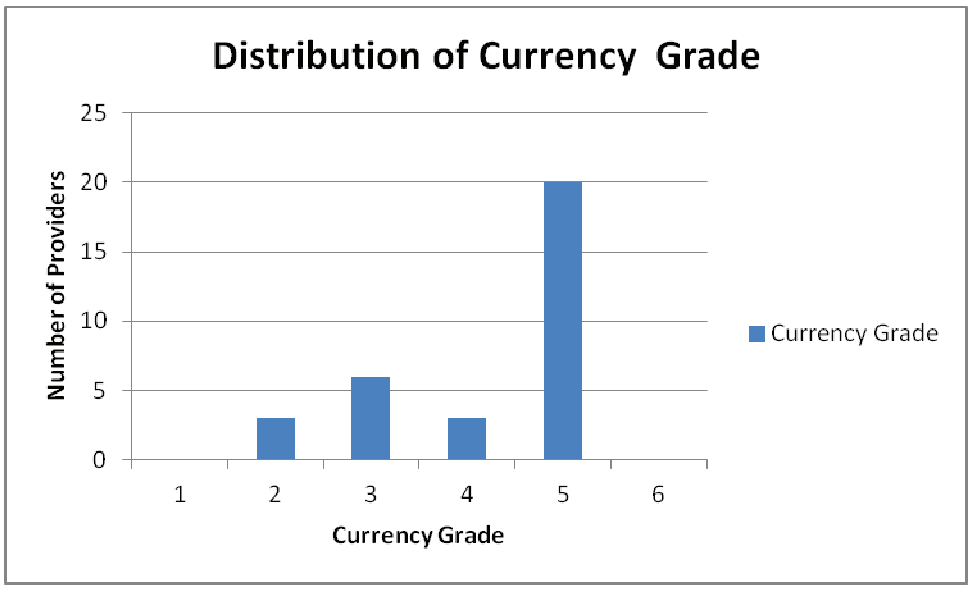


Figure 2 Distribution of Currency Grade

Data Confidence Based on Verification

A good source of data confidence is the data quality assessment that the FCC/NTIA perform using data from third party sources. The NTIA provides a report to each state with a data assessment of how each biannual submission stacks-up against the third party data sources. They report on the number of mismatches for the provider name, technology code, and maximum advertised upstream and downstream speeds.

We are proposing to use the FCC/NTIA's third party comparison to obtain a **Verification** grade for each provider's data. The mismatch count is used as a measure of the confidence we have in our data submissions. The following should be noted regarding the methodology:

1. This Verification grade is based on data from an older submission because the FCC/NTIA data assessment is only available many months after our submission. The assumption is that the data from providers does not vary dramatically from submission to submission. The data verification grade will be based on the last data quality assessment we received from the NTIA.
2. The FCC/NTIA assessment compares the state submission against more than one data source and provides statistics that are based on matching each of the data sources. In many instances, the mismatch count indicates that the state's data agreed partially, indicating that the third party data sources are not in agreement. We ignore such cases and only consider the mismatches where the state's submitted data element did not match even a single third party source.
3. When a submitted data element does not match the third party data there is uncertainty regarding the source of the discrepancy. The error may be in the submission or it may be in the reference data and this has been acknowledged by the FCC/NTIA. In that sense, a perfect match with all the data sources is a stronger assertion of quality than the presence of mismatches is an indicator of poor data quality. Our approach therefore makes allowances for mismatches that

are not proven to be caused by the provider. A low percentage of mismatches raises the grade of a provider, but a very high percentage of mismatches does not lower the provider's score too much.

4. All mismatches are not the same because there is a dependency among the data fields. For example, in the *CensusBlock* table, we look at the provider name mismatches. Where there is no match with the provider name in the given census block, i.e. none of the third party sources reported the provider in the census block, the other fields such as the technology code and speeds are also automatically mismatched. In other words, a match in technology code can occur only when the provider name matches for the given census block. Similarly, upstream and downstream speeds can only match if the technology code matches.

Methodology for Verification

The methodology we have used to assign a Verification grade to providers using the third party comparisons is described below. For each unique FRN in the *CensusBlock* table for wireline providers and *Wireless_by_Block* table for wireless providers we determine the following:

Total Records $\mathbf{C_x}$ = total # of records for FRN = <x>

Provider Name mismatch count:
$\mathbf{M1_x}$ = # of records where **PN_SCORE = 0 AND FRN = <x>** for wireline
$\mathbf{M1_x}$ = # of records where **PN_M_COUNT = 0 AND FRN = <x>** for wireless

Tech Code mismatch count:
$\mathbf{M2_x}$ = # of records where **TT_SCORE = 0 AND PN_SCORE > 0 AND FRN = <x>** for wireline
$\mathbf{M2_x}$ = # of records where **TT_M_COUNT = 0 AND PN_M_COUNT> 0 AND FRN = <x>** for wireless
- (PN_SCORE/PN_M_COUNT > 0) ensures that there is a valid Tech Code to compare against

Maximum Advertised Downstream Speed mismatch count:
$\mathbf{M3_x}$ = # of records where **MADS_SCORE = 0 AND TT_SCORE > 0 AND FRN = <x>** for wireline
$\mathbf{M3_x}$ = # of records where **MADS_M_COUNT = 0 AND TT_M_COUNT > 0 AND FRN = <x>** for wireless

Maximum Advertised Upstream Speed mismatch count:
$\mathbf{M4_x}$ = # of records where **MAUS_SCORE = 0 AND TT_SCORE > 0 AND FRN = <x>** for wireline
$\mathbf{M4_x}$ **= # of records where MAUS_M_COUNT = 0 AND TT_M_COUNT > 0 AND FRN = <x>** for wireless
- (TT_SCORE> 0) ensures that there is a valid Speed entry to compare against

$\mathbf{W_i}$ (i = 1..4) - weight given to each mismatch count by type

$\mathbf{W_1 = 4}$ (Provider Name mismatches have a weight of 4 because once there is a mismatch in Provider Name, none of the other 3 types can be matched)

$W_2 = 3$ (Technology Code mismatches have a weight of 3 because once there is a mismatch in Tech Code, the two speeds cannot be matched)

$W_3 = W_4 = 1$ (The weight for mismatch in MADS and MAUS scores is 1 because no other metric depends on them)

Mismatch % S_x = 100 *Average ($\frac{M1x*W1}{Cx}, \frac{M2x*W2}{Cx}, \frac{M3x*W3}{Cx}, \frac{M4x*W4}{Cx}$ **)**

This metric **S_x** is used to assign a Verification grade to each provider. The weights are used to reflect the dependencies among the mismatch types. For example, in the case where none of the records from a provider have a match on provider name, it is appropriate for the score to be 100%. On the other hand, if the provider has good matching on provider name and tech code, but has poor matching on speed, we expect the mismatch score to be low.

A Verification grade is assigned to the provider from a range of 1 (lowest) to 5 (highest) based on the following criteria:

5: $S_x < 1\%$

4: $S_x < 10\%$

3: $S_x < 40\%$

2: $S_x > 40\%$, source of discrepancies not resolved

1: $S_x > 40\%$, source of discrepancies resolved to provider data

The Verification grade reflects the confidence we have in the data submitted by the provider based on past performance as assessed using the third party comparison data.

Verification Based on Third Party Assessment of December 2011 Data

This section reports on the results obtained from applying the methodology described earlier to the *National Broadband Map Data Quality Assessment* performed by the FCC/NTIA on December 2011 data. As part of this assessment the NTIA provided each state with a database that included the results of their comparison of the submitted data against data from multiple third party sources. The database contains the *CensusBlock* table for wireline and *Wireless_by_Block* table for wireless which in turn include the data of interest for our evaluation. The *CensusBlock* table has 528401 records with 21 unique FRNs (providers) and the *Wireless_by_Block* table has 1618164 records with 11 unique FRNs.

We applied the methodology for each provider in both tables and assigned a Verification grade to each provider. New Jersey's October 2012 submission included 32 providers. Three providers in the October 2012 submission could not be verified because they were not assessed in the FCC/NTIA comparison. Their grade is denoted as "NA". There were several providers that had mismatch metric S_x of more than 40%, but in none of the cases were we able to pinpoint the source of the discrepancies to be the provider. Therefore, the lowest grade assigned is 2. The chart in Figure 3 shows how the grades were

distributed across the 33 providers that were included in the New Jersey October 2011 submission. The results of our analysis of the FCC/NTIA's third party comparisons were provided to the providers with significant mismatch percentages in an attempt to improve future results.

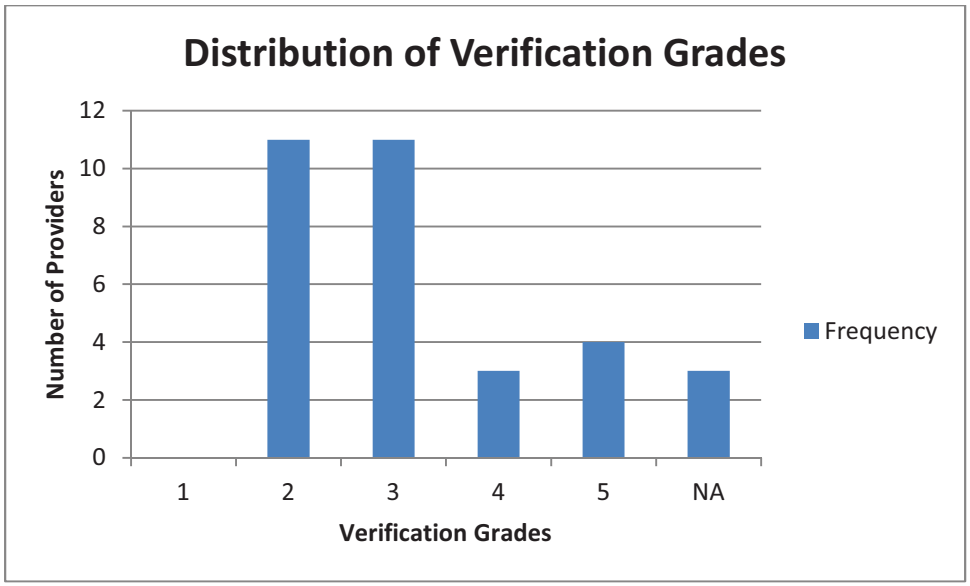


Figure 3 Distribution of Verifications Grades

The complete list of providers and the grades they were assigned on the three different measures of confidence are provided in the spreadsheet embedded below.

DataConfidenceRatings_2012_12_21.xlsx

Summary

We have laid out a methodology for assessing our confidence in New Jersey's data submitted towards the National Broadband Map initiative of the NTIA. It has three components based on the *source* of each provider's data, the *currency* of the data and *verification* through third parties. We have also applied this methodology to the data from our last submission from October 2012 and presented the results of the assessment. In summary, the grades on the Source of the data indicate that several providers are submitting data in a format that reduces our confidence in them. The grades on Currency are good overall, with most providers' data being current and up-to-date. The grades in Verification are low overall, but the source of the discrepancies is not clearly known. We need to work more closely with providers to see if these grades can be improved in future submissions. Our intent is to apply and evaluate the application of this methodology of assessing data confidence to future data submissions, including the April 2013 one, with the objective of further validating and improving it.

Appendix F: Speed Test Website White Paper

Authors: Cliff Behrens and Marek Fiuk **December 21, 2012**

Speedtest Website Tool Evaluation and Initial Design

Crowd-sourcing Speed-tests: Further Evaluation of OOKLA Speedtest.net

Based on a reading of Bauer et al.[1], and as discussed in an earlier document[2], we concluded that the OOKLA Speedtest.net tool would be our first choice to investigate for use for crowd-sourced speed testing. In particular, OOKLA is capable of delivering advantages over NDT, the other tool used by the FCC for its consumer broadband speed-tests. Specifically, the OOKA tool utilizes multiple TCP connects to collect data, important for avoiding receive window limitations, and it is also more likely to connect to a server that is relatively close to the testing client. Moreover, OOKLA Speedtest.net does not require Java on the test-taker's client. The OOKLA approach became even more attractive when we learned that they offer, at no charge, a scaled-down version of their tool, Speedtest.net mini.

Further investigation, however, involving a teleconference with an OOKLA account executive and closer examination of information posted on the OOKAL knowledge base and FAQs, revealed that Speedtest.net mini would not meet our needs. The reasons for this are as follows. While the Speedtest.net mini client is free, and an XML file is provided whereby one can grant the test-taker's Flash Player permission to talk to a Speedtest.net server, there is no automatic way to capture speed test results. OOKLA has a program so that one can apply to host a Speedtest.net location, and even direct users to it. In this case the purported advantage of testing against a server 'close' to the test-taker would be lost. Additionally, all results are still forwarded by the client to an OOKLA database. While test-takers usually select the server closest to them, the only way to guarantee that our own server is exercised by visitors to our speed-test webpage requires a custom setup by OOKLA to its DNS entries. Even with this customization, the speed test results are only sent to OOKLA. A login to OOKLA's reporting system is required so that the Speedtest.net hosting sponsor can view all results run against their server in real-time.

Based on the considerations above, we then conducted an investigation into the NDT tool and have subsequently determined that it is a better match to our needs. We are designing a speed-test web service using the NDT tool, as has the State of NY. Since this tool is open-source and includes both server and client code, we will have the flexibility to conduct speed-tests from our NJ BB Mapping website, capture the results, and associate these with the other ancillary data, collected from the same test-takers, needed to validate data we receive from NJ BB service providers. While NDT does not utilize multiple TCP connects, this disadvantage is strongly outweighed by its other attributes. Looking ahead, NDT will also enable us to collect speed test data from wireless users, currently those who use Android

devices to access the Internet and perhaps others in the future. We have begun developing an NDF-based speed-test website architecture deployment plan. The latter will address steps we need to take to ensure test-taker's privacy and network security. We have constructed a user scenario and an initial speedtest website design to support it. These are presented in Figure 1 below.

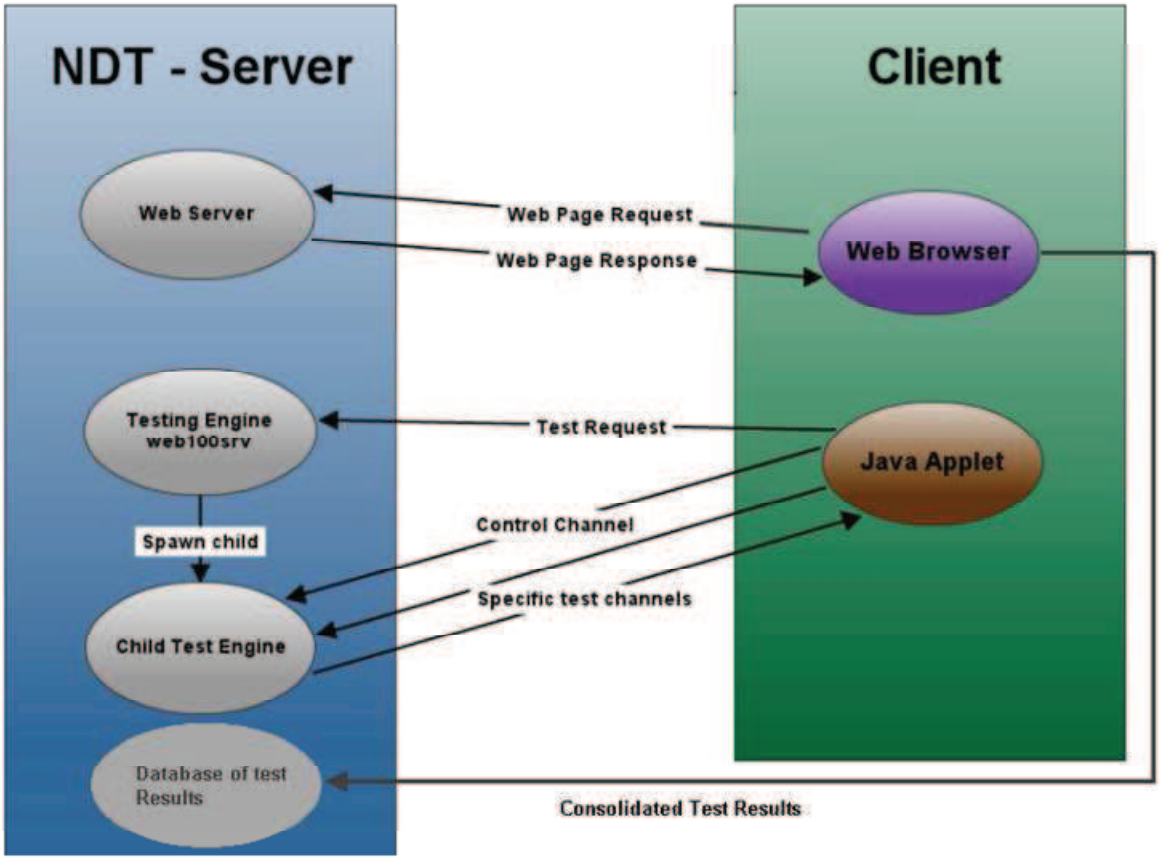


Figure 1. Initial design of NJ broadband mapping speedtest website using NDT technology.

Speedtest scenario: Using a web browser, a test-taker accesses the speedtest website from a NJ-OIT Broadband Mapping webpage, enters validation data in an online form, runs one or more NDT speedtests, and receives results which, along with the validation data, are also stored by the speedtest webserver.

1. The process starts with the user clicking on a hyperlink posted on an NJ-OIT webpage pointing to the ACS server hosting the NDT speed test service (engine).

2. The web server responds by returning the page, with an embedded java applet (class or jar file).

3. The user must manually request that a test be performed by clicking the "start" button.

4. Collection of ancillary data should precede speedtest, otherwise little use for speedtest results.
5. The applet opens a connection back to the server's testing engine (web100srv process).
6. A child process is created to handle the test and the parent goes back to listening for more test requests. The parent keeps a FIFO queue to process multiple requests.
7. A control channel is created between the server and the client to control the client's actions and synchronize the start of the various tests. The server and the client negotiate the test suite.
8. The NDT client and the NDT server perform the negotiated test suite. The client opens new data channels back to the server for testing purposes. Allowing the client to open connections makes it easy to get past client-side firewall boxes.
9. The server extracts the Web100 data and analyzes the connection for faults.
10. The results are recorded in the servers' log file and the results are returned to the client for display to the user.
11. The client consolidates the results with the ancillary data (obtained with an associated input form) and stores them in a database on the server.

We intend to begin implementation of this speedtest website and address test-taker privacy and security issues during 1Qtr2013.

New Mexico State Broadband Initiative

Mapping Methodology: April 1, 2013

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New Mexico State Broadband Initiative
Mapping Methodology: April 1, 2013

Table of Contents

New Mexico State Broadband Initiative Mapping Methodology: April 1, 2013

Introduction

The State of New Mexico (hereafter, NM or State), through its agents Earth Data Analysis Center (EDAC [Mapping Team]) at The University of New Mexico and NM Department of Information Technology (DoIT), submitted the April 1, 2013 New Mexico Broadband (NMBB) Program data package, in compliance with the National Telecommunications and Information Administration (NTIA) State Broadband Initiative Program (SBI).

Data Submittal Description

The NMBB April 1, 2013 data submission includes:

- NMBB _DeliverableMemo_2013_04_01.pdf: This document describes NMBB data submittal components, state-restricted data fields, and contact information.
- NM_SBDD_2013_04_01.gdb: The NMBB geodatabase was created to NTIA standards and includes FGDC-compliant metadata for the database layers.
- NM_DataPackage_2012_31_12.xlsx: The FCC-prepared data-package spreadsheet consists of three worksheets for overview and checklist, record count, and provider table.
- NM_2013_04_01.txt: The data receipt file generated from running the Check Submission Tool, lists pass/fail for received data-submission layer and field entries.
- NM_ReadMe_2013_04_01.txt: This readme gives a brief description on the error or warning messages generated by the Check Submission Tool.
- NM_Methodology_2013_04_01.pdf: The Methodology document is included in the submitted package.
- NM_Changes_ and_Corrections_ 2013_04_01.pdf: The document corresponds to a readme document, especially for Internet Service Provider (ISP) information.
- NMBB_Provider_ Data_ Request_Template.xls: The data-request spreadsheet contains an overview and upload instructions in addition to eight worksheets for different types of service, subscriber speed, and community anchor institutions.

All files were zipped together and submitted as NM_SBDD_20130401.zip.

SBDD Geodatabase Layer	Number of Records: April 1, 2013
BB_Service_Address	0*
BB_Service_Road_Segment	9,797
BB_Service_CensusBlock	153,656
BB_Service_CAInstitutions	3,185
BB_Service_Wireless	43
BB_Service_Overview	159
BB_ConnectionPoint_LastMile	0*
BB_ConnectionPoint_MiddleMile	487

* Due to restrictions in the Non-disclosure Agreement (NDA) with New Mexico Internet Service Providers (ISPs), New Mexico cannot populate the Service Address and Last-Mile feature classes in the NMBB Geodatabase.

Provider Participation

The NMBB Program, in January 2013, requested broadband data for the April 2013 (Round 7) submittal from sixty-four (63) companies, which represented seventy (70) NM Internet Service Providers (ISPs).

A total of forty-three different ISPs, representing thirty-seven companies, responded to this data request. Of those, thirty-two ISPs (representing thirty-five companies) provided data and the others indicated no changes to their previously-submitted data. And one ISP is still identified as not a broadband provider because the provided speeds did not meet broadband requirements. Six (6) ISPs' contact information has changed and we were not able to obtain their correct contact information.

Additionally, MegaPath Corporation acquired Covad Communications Company.

Internet Service Providers	Number: April 1, 2013
Contacted	70
Responded: Provided Data	35
Responded: No Changes to Data	7
Responded: Will not Participate	0
Responded: Not NM Broadband Provider	1
Did Not Respond: Previously Submitted Data	6
Did Not Respond: Never Submitted Data	21

See *Appendix A: Table of New Mexico Internet Service Providers* for those ISPs included in the data request and the participating ISPs.

Data Verification Techniques

Consistency Checks

- EDAC reviewed data provided by NM ISPs for completeness (and/or consistency), per NTIA Data Transfer Model requirements. The NMBB Program contacted ISPs by e-mail to request any missing information.
  This review included comparing newly provided data with the provider's previous data sets. Discrepancies or inconsistencies were noted and addressed through e-mail correspondence with the provider. *Appendix B: ISP-Data Verification and Validation* presents examples of these e-mails.
  See sections *1. Data Collection, 1.5 Data Evaluation* and *2. Data Validation, 2.1 Data Assessment, 2.6 Final Data Validation*.
- For those ISPs who provided block- or segment-level coverage, the Mapping Team checked for coverage containment within known service boundaries.
  See section *3. Data Processing, 3.3 GIS Data Verification*.
- For ISPs providing wireless coverage, the Team checked for coverage containment to New Mexico. (*3.3 GIS Data Verification*)

- If an ISP provided Census Block shapefiles, the Team checked the area of the block to confirm that it fell into the categories for area less than 2 sq. mi. or greater than 2 sq. mi.
  (*3.3 GIS Data Verification*)
- The Mapping Team performed speed checks on data received from the ISPs to make sure they met broadband requirements.
  (*3.3 GIS Data Verification*)
- Topology is validated after loading the data into the geodatabase to identify any inconsistencies in data.
  See section *3. Data Processing, 3.6 Validate Geodatabase*.
- Checked Speed values using the NTIA Readme.txt and Data_Model_Changenotes.txt files, provided with the data model in December 2012.

Geocoding

- The Mapping Team geocoded address data using different reference street data sets to determine which road reference data set provided the best match. Sometimes a combination of reference data sets was used to obtain better address match rates.
  See section *3. Data Processing, 3.1, 3.2 GIS Data*.
- Unmatched records were sent to the ISP as part of the validation process, with a request for better address information.
  See section *3. Data Processing, 3.3, 3.4 GIS Data Verification, Updates, and Edits*.

NM ISP Feedback Loop

- After processing ISP data, the Mapping Team sent Feedback maps for approval. Any issues for how the service area was represented on the map, such as addition or removal of service, were addressed and corrected, as appropriate. Revised maps then were sent to the provider for review and approval. Feedback maps also included propagation-model results for Wireless broadband.
  See section *3. Data Processing, 3.3, 3.4 GIS Data Verification, Updates, and Edits*.
  See *Appendix C: Feedback and Propagation Model Map*.

Workflow Processing Scheme

New Mexico acknowledges the importance of understanding data reliability and integrity as the Provider data are processed for NTIA submittal. The NMBB Data Workflow and Processing Scheme includes four broad stages:

1. Obtain – Acquire raw Provider data.
2. Validate – Check for internal data consistency and for consistency with external data sources.
3. Process – Develop Geographic Information System (GIS) data and update NTIA Geodatabase.
4. Report – Submit the final Geodatabase to NTIA.

These stages and their relationships are depicted in the diagram below, and are discussed in the sections that follow. The April 1, 2013 Data Workflow and Processing Scheme did not change from the April 2011 scheme and so retained the V3.0 designation.

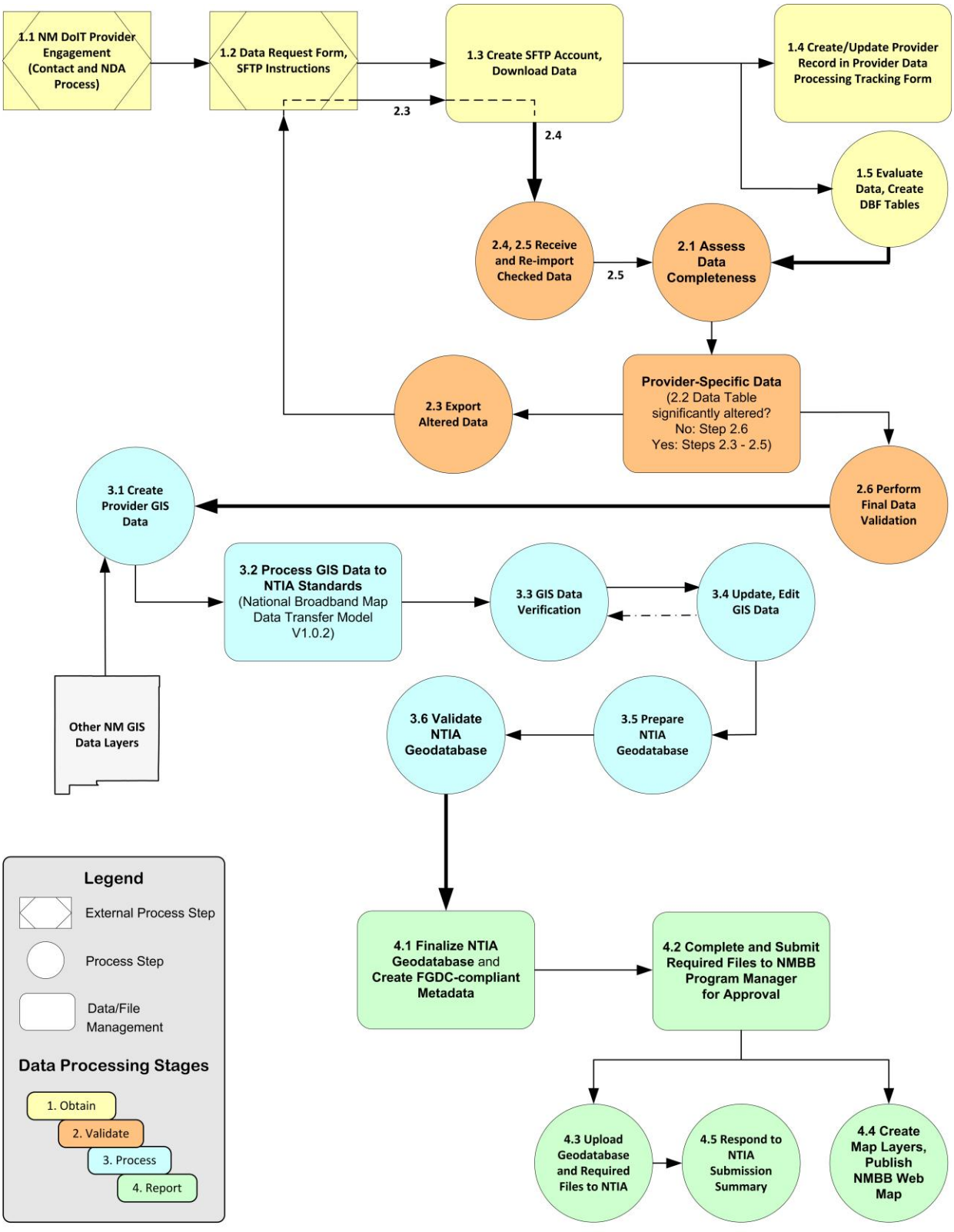


Figure 1 New Mexico Broadband Workflow and Processing Scheme

1. Data Collection

1.1 Provider Engagement

The NM Department of Information Technology established contact with each New Mexico Broadband Provider and negotiated a signed NDA with the State and with EDAC, as required.

1.2 Data Request

EDAC sent an e-mail requesting broadband data to sixty-four NM companies (seventy ISPs) in January 2013 and a reminder e-mail in February to those who had not responded. In addition to an NMBB Program overview and formal request for data, the message included a Web link for the NM Broadband Data Request Form (MS Excel Worksheet); this form included instructions for completing the eight data worksheets and for securely uploading Provider data to the EDAC Secure FTP site.

Data Request Schedule

NMBB Round 7 Data Collection Announcement	01/22/2013
NMBB ISP Data Collection Due	02/28/2013
NMBB Feedback Maps to ISPs for Approval	03/11/2013
NMBB ISP Feedback Due	03/22/2013
NTIA Round 7 Data Due	04/01/2013

1.3 Data Receipt

EDAC created a Secure File Transfer Protocol (SFTP) site for broadband data upload, and created an account on the site for each NM Provider. Each Provider is assigned a unique username and password; this account information is stored in the NMBB SFTP Account Management form.

Provider data arrive in numerous formats, including NMBB or Provider spreadsheets, shapefiles, CAD files, and text files. These data are downloaded from the SFTP site to the EDAC network.

1.4 Provider and Data Tracking

EDAC creates or updates the specific Provider record in a Provider Data Processing Tracking Form. Throughout the data process, each Tracking Form step is recorded with analyst initials and date of task completion. Steps include:

- Record Provider name information and the assigned 2-digit Primary Key (PKey).
- Record the Holding Company Name, DBA Name, FRN (if available), and whether Community Anchor Institutions data are provided.
- Record type of files submitted; date of data submission and the initials of the receiving GIS analyst; and how data were submitted (e.g., FTP or physical medium).

1.5 Data Evaluation

EDAC evaluates the uploaded Provider data for consistency with the NTIA data model and previously submitted data and creates database-format tables.

2. Data Validation

2.1 Data Assessment

EDAC assesses the submitted data for completeness according to the National Broadband Map Data Transfer Model:

- Identify fields (names, types);
- Fill in missing data, if possible; and
- Check field codes, and standardize the values where appropriate.

2.3 Data Export

If the data are incomplete, based upon the above assessment steps, EDAC performs the *If required* steps, below; otherwise, EDAC proceeds with data validation. Changes and assumptions are documented.

If required:

- 2.2 Was the Data Table significantly altered? If yes, go to step 2.3. If no, go to step 2.6.
- 2.3 Return data in standardized format to the Provider for completion.
- 2.4 Receive modified data back from Provider.
- 2.5 Re-import data.

2.6 Data Validation

EDAC performs the final data validation for each Provider's data set: all missing data filled in; all field codes checked and standardized where appropriate. EDAC checks the ISP's provider name and FRN number using FCC's Commission Registration System (CORES) database. https://fjallfoss.fcc.gov/coresWeb/publicHome.do

3. Data Processing

3.1, 3.2 GIS Data

EDAC creates and verifies Provider-specific GIS data, using ArcGIS 10.1 software and third-party data sets.

- New Mexico Road Centerline (NM RCL) data files [Geocoding; Primary Roads Data Set]
- NM Telephone Exchange Boundaries 911 [Census Blocks Processing]
- U.S. Census TIGER/Line shapefiles [Geocoding]
- NAVTEQ Road data files [Geocoding]
- ESRI Cable Boundaries data file [Census Blocks Processing]
- Ancillary consistency checks include comparison with other data sources that are available through the New Mexico geospatial clearinghouse – Resource Geographic Information System (RGIS; http://rgis.unm.edu)
- Propagation model results

EDAC processes the GIS data according to the National Broadband Map Data Transfer Model.

Middle Mile Points

- ISPs provide the geographic coordinates for Middle Mile points. Those points are exported as shapefiles and a spatial join is performed against Census 2010 Blocks to obtain FULLFIPSID.
- Data sets are further processed by adding required fields based on the NTIA Data Model.

Census Blocks

- ISP data were requested for the Census 2010 Blocks, rather than the Census 2000 Blocks.
- If an ISP provides the Census Block IDs, then those tables are spatially joined with the Census 2010 Data and the blocks are extracted. Then, the Census Blocks (Area < 2 sq. mi.) are extracted.
- If the ISP provides address-specific data, those addresses are geocoded against the New Mexico Road Centerline (NM RCL) address locator. Unmatched addresses are processed against third-party data sets, such as the NAVTEQ Road data purchased by the State as a part of the NMBB project, and ESRI Road data. All of those matched records are appended together to obtain a single address data set. The address points are aggregated spatially to the Census Blocks, and the Census Blocks (Area < 2 sq. mi.) are extracted.
- If an ISP provides shapefiles of Census Blocks, EDAC verifies those to make sure they are less than 2 sq. mi. in area.
- If an ISP provides telephone exchange boundaries instead of addresses, then those boundaries are verified with the NM Telephone Exchange Boundaries 911 data set, and Census Blocks (Area < 2 sq. mi.) that lie within those boundaries are extracted. If an ISP provides the CO/RT locations, then a buffer of 1800 ft. is drawn, and the Census Blocks (Area < 2 sq. mi.) that intersect with the buffer area are extracted.
- If an ISP provides service areas instead of addresses for Cable, then the service areas are verified with the ESRI Cable Boundaries data file. Census Blocks (Area < 2 sq. mi.) that lie within the boundaries are extracted.
- Resulting Census blocks were checked for the attribute ALAND10 (2010 Census Land Area); blocks with Area = 0 were deleted from the data set.
- If an ISP does not provide data for this data-submittal round, data processed for the previous rounds are used for the current submittal.
- Data sets are further processed by adding required fields based on the NTIA Data Model.

Road Segments

- If an ISP provides address-specific data, EDAC geocodes those points (using a process similar to that explained above in *Census Blocks*). The address points are aggregated spatially to Census Blocks, and the blocks with area greater than 2 sq. mi. (Area > 2 sq. mi.) are extracted. NM RCL roads within those Census Blocks are exported, and the geocoded address points are spatially joined with adjacent road segments within a distance of 25 ft. (or 30 ft. for rural areas). The road segments with joined address points are selected and exported.
- If an ISP provides road segment data with address ranges, any one of the address range values (TO/FROM) for the road is taken and the data are geocoded. Or, if no address ranges are provided, the address file is joined with the NM RCL roads, based on Street Name, City, and Postal Code and the matched records are extracted. This involves manual data processing.

- If an ISP provides Tiger/Line roads data, those roads are extracted from the U.S. Census Tiger/Line shapefile by joining them based on the TLID (Tiger/Line ID). NM RCL road data that match the Tiger/Line roads are exported. If there are no matched roads in RCL data then Tiger/Line roads are submitted to NTIA.
- If an ISP provides Telephone Exchange Boundaries or CO/RT locations or Cable service area boundaries, road segments for these data sets are not processed due to uncertainty about the NMBB procedures for these cases. EDAC checks for ISP-provided address-specific data and, if those data are present, processes the data using the first-listed *Road Segments* step. Otherwise, those roads are not further processed.
- To improve upon the above-mentioned uncertainty, EDAC tested a different road-segments processing step by selecting two ISPs with coverage for Census blocks greater than 2 sq. mi. in area and adjoining smaller blocks. For those ISPs, EDAC processed road segments data by clipping the roads to the large blocks and manually choosing the road segments that were closer to the smaller blocks (less than 2 sq. mi. in area) with broadband coverage from the same ISP. EDAC has provided feedback maps to the ISPs and is currently assessing the processed results for improved accuracy.
- Data sets are further processed by adding required fields based on the NTIA Data Model.

Community Anchor Institutions

- EDAC created an Anchor Geodatabase that has data for all the Community Anchor Institutions, such as Schools, Libraries, Health Care, Higher Education, Public Safety Facilities, Government Agencies, and Non-governmental Institutions throughout the State of New Mexico. These data were obtained from different sources, including the Public School Facilities Authority (PSFA), New Mexico State Library, Homeland Security Information Program (HSIP), and NM Resource Geographic Information System Program (RGIS).
- EDAC developed a Community Anchor Site Assessment (CASA) crowd-sourcing application to collect information about Institutions and their Broadband Internet Access in the State of New Mexico. These results are added to the Anchor Database after locations are validated against satellite and aerial imagery.
- There are no changes to the UNM Bureau of Business and Economic Research (BBER) digital-literacy-survey data for non-governmental-organization (NGO) community support.
- Broadband data provided by the ISPs are also included in the geodatabase. EDAC uses the third-party USAC (Universal Service Administrative Company) data set for broadband information for Schools and the NM State Library data set for broadband information for Libraries.
- The Anchor Geodatabase is further processed to meet the NTIA requirements. NCES IDs for schools, IPEDS IDs for higher education, and IMLS IDs for libraries are obtained from the respective Web sites and are joined with records in the geodatabase.
- Data sets are additionally processed by adding required fields based on the NTIA Data Model.

Wireless

- If an ISP has multiple spectra, the provided polygon is duplicated for each spectrum and then appended together to obtain a single shapefile with stacked geometry.

- If an ISP provides only tower locations (address or coordinates) instead of shapefiles showing their wireless coverage, EDAC generates wireless coverage using SiteSync propagation modeling software. For this, we request additional information from the ISP, such as: Location (address or coordinates), Antenna pattern (omni-directional, 180, 120, 90, etc.), Transmit frequency (MHz), Transmit Antenna Gain (dBi), and Antenna elevation.
- If an ISP provides tower location (address or coordinates), transmit radius and no other above mentioned variables, those locations are mapped and a buffer is drawn with the transmit radius.
- Wireless-coverage polygons with area less than 0.125 sq. mi., whether ISP-provided or modeled, are eliminated from the coverage, per NTIA specifications.
- If an ISP indicates providing Satellite services state-wide, a state boundary file is added to the database, processed per NTIA requirements.
- If an ISP provides KMZ (or KML) files, those files are converted to shapefiles and are further processed to remove the polygons with area less than 0.125 sq. mi.
- All of these wireless polygons were clipped to the New Mexico State Boundary to ensure that they fall within the state.
- Data sets are further processed by adding required fields based on the NTIA Data Model.

Overview

- This set of notes applies to wire-line data, only.
- If an ISP provides the Subscriber Weighted Nominal (SWNOM) Speed of respective technology types for the counties it serves, those values are joined with the County boundary file from the U.S. Census Tiger/Line shapefiles.
- If an ISP provides the technology of transmission, number of subscribers, and the maximum advertised speed for the Counties it serves, the SWNOM Speed is calculated and the values are joined with the County boundaries shapefile.
- These county files from each ISP are appended together to obtain a statewide stacked geometry. Data are further processed by adding required fields based on the NTIA Data Model.

3.3, 3.4 GIS Data Verification, Updates, and Edits

Processed data are developed as Provider-specific spreadsheet and GeoPDF products. As the first step in New Mexico's Provider feedback loop, EDAC places each Provider's products on the SFTP site and requests that Providers verify accuracy and identify needed edits and corrections. Eleven (11) ISPs responded to the verification request in the April 1, 2013 data submission cycle.

GIS and modeled data are updated and edited, based on Provider feedback, and modified data products (spreadsheet and GeoPDF) are delivered to the Provider through the SFTP site for final verification and to complete the feedback loop.

3.5 NTIA Geodatabase Preparation

EDAC produces a final "clean" GIS data set from the processed and Provider-specific, versioned feature data sets, and then prepares the NTIA Geodatabase from these finalized GIS data. Crowd-sourced data were not used for preparation or validation.

3.6 NTIA Geodatabase Validation

EDAC validates the geodatabase by performing the validation checks provided below and by running the geodatabase through the SBDD_CheckSubmission tool. EDAC then assigns Quality Assurance/Quality Control (QA/QC) values.

- Repair Geometry
- Validate Topology
- Check Provider identification fields by Frequency tool and Summarize tool
- Check for Provider Name, Census Block, and Transmission Technology. Each ISP (Provider Name) should have only one Census Block per Transmission Technology.
- Check for Null values in Transmission Technology codes, PROVIDER_TYPE, FULLFIPSID, STATEFIPS, COUNTYFIPS, TRACT, BLOCKID, GEOUNITTYPE, STATECOUNTYFIPS fields
- Check for Null values in OWNERSHIP, BHCAPACITY, BHTYPE, TRANSTECH, ANCHORNAME, ADDRESS (BLDGNBR, STREETNAME), CITY, ZIP5, STATE, Latitude, Longitude fields
- Check Maximum advertised and typical down/upload speed fields for null values and for valid domain values: MAXADDOWN/TYPDOWN < MAXADUP/TYPUP; MAXADDOWN < '0' OR MAXADDOWN > '11'
- BHCAPACITY <0 and >9, BHTYPE <0 and >4, CAICAT <1 and >7
- Check for SPECTRUM values <1 and >10
- Speed Tiers:
    - DSL download speed tier: if 7 or higher, contact ISP to verify
    - Cable Modem – DOCSIS 3.0 should not be 7 or lower
    - Cable Modem – Other should not be 9 or higher
    - Fixed Wireless download speed tier should not be 8 or higher

4. NMBB Report and Submittal

4.1 Finalized NTIA Geodatabase and Metadata

EDAC finalizes the Geodatabase per NTIA standards (National Broadband Map Data Transfer Model) and creates the associated metadata.

4.2 NMBB Program Manager

The NMBB Program Manager receives the finalized Geodatabase through the SFTP site and approves the files for submittal to NTIA.

EDAC completes and delivers all files to the NMBB Program Manager, as required by the Program. Files include correspondence logs with NM Providers, documentation for Web mapping activities, and the Provider-specific Data Processing Tracking Form.

4.3 NTIA Submittal

The Geodatabase and required files (data transmittal memorandum, Provider data request template [not a required file], data package spreadsheet, check-submission receipt, methodology, and changes and corrections) are uploaded, using the FCC/NTIA SFTP site.

4.4 NMBB Map Layers

Following the NTIA submittal, EDAC creates GIS map layers from the Geodatabase and publishes them to the New Mexico Broadband Program Mapping site, www.nmbbmapping.org/mapping/.

4.5 Response: NTIA Submission Summary

NM DoIT and EDAC developed a document template to respond to the NTIA Submission Summary, both to address NTIA-identified issues or gaps and to request clarification and additional information. New Mexico responds within one week of receiving NTIA's Submission Summary.

NMBB System Security

System Security

The NM Broadband Server is a fully patched Windows Server 2008. The server is protected by Symantec Endpoint Protection and a double firewall.

The first layer of firewall protection is a Cisco hardware firewall that protects the Server from any intrusion from outside the EDAC network. This firewall only allows connections on Ports 80 and 22.

- Port 80 allows Web browsing.
- Port 22 allows Secure FTP. SFTP service is fully encrypted with SHA1 stored passwords.

The Windows software firewall is configured to allow access on Ports 80, 22, 443, and 3389.

- Port 443 gives EDAC developers the ability to configure ArcGIS Server from within the EDAC network.
- Port 3389 gives EDAC system administrators the ability to configure the base Windows server from within the EDAC network.

Server Connections

Connect to the Server from the outside:

- HTTP: No authentication (simple Web browsing).
- SFTP: Authentication required and fully encrypted.

Connect to the Server from within the EDAC network:

- HTTPS: Authentication required and fully encrypted.
- RDP: Authentication required and fully encrypted.
- SMB: Port 445, Windows file-share port.

Virtual Machine and Networked Drive Back-ups

The NMBB Virtual Machine (VM) is a dedicated server.

Back-up: Development Networked Drive (not published)

- Daily: A differential back-up to a tape server is performed; the tape server is connected to a secure tape library.
- Friday/Weekend: A full back-up of the networked drive is performed to the secure tape server.

Back-up: Virtual Machine (published)

- Daily: The entire VM is backed up by VDR (VMware Data Recovery [application]) to a secure, self-contained data store.
- Weekly: The entire VM is backed up to a TrueCrypt volume in remote storage.

Physical Security

NM Broadband Server physical security is accomplished through:

- Controlled-environment floor space in a locked, code-protected room for system servers, and
- An uninterrupted power supply (UPS).

Lessons Learned

EDAC devised an approach to further engage wireless-service ISPs that had submitted incomplete data. This approach involved generating feedback maps based on approximated propagation-model parameters and sending those maps to ISPs. The approach was successful in prompting them to respond with accurate values. EDAC then generated modified feedback maps. Beginning with an approximate coverage and refining that coverage based on the resulting ISP feedback has improved NMBB data collection and broadband-coverage displays.

NMBB Web Map

The New Mexico Broadband Map (www.nmbbmapping.org/mapping/) is developed as part of the NMBB Program for the State of New Mexico. This Web map displays all of the processed ISP broadband data that are submitted to NTIA for the National Broadband Map, and the processed statewide satellite-service data.

Figure 2 (below) is a screen-capture image of the New Mexico Broadband Map V 4.0 with Data Update: 1 October 2012 [map data are updated following each NTIA data submittal]. Map layers for DSL (green), Cable (dark red), Fiber (magenta), and Copper Wire (cyan) broadband coverage are displayed with Tribal Land Boundaries and the Streets base map. Fiber, Fixed Wireless, Mobile Wireless, and Satellite layers are not displayed. Tools include: layer selection; base map selection; dynamic legend; slider-bar and custom zoom; drag-and-drop and directional pan; full, previous, and next extent; identify; find address; scale bar; and print map. Additionally, the mapping site provides a feedback tool, help (online user guide), program information, and New Mexico's disclaimer.

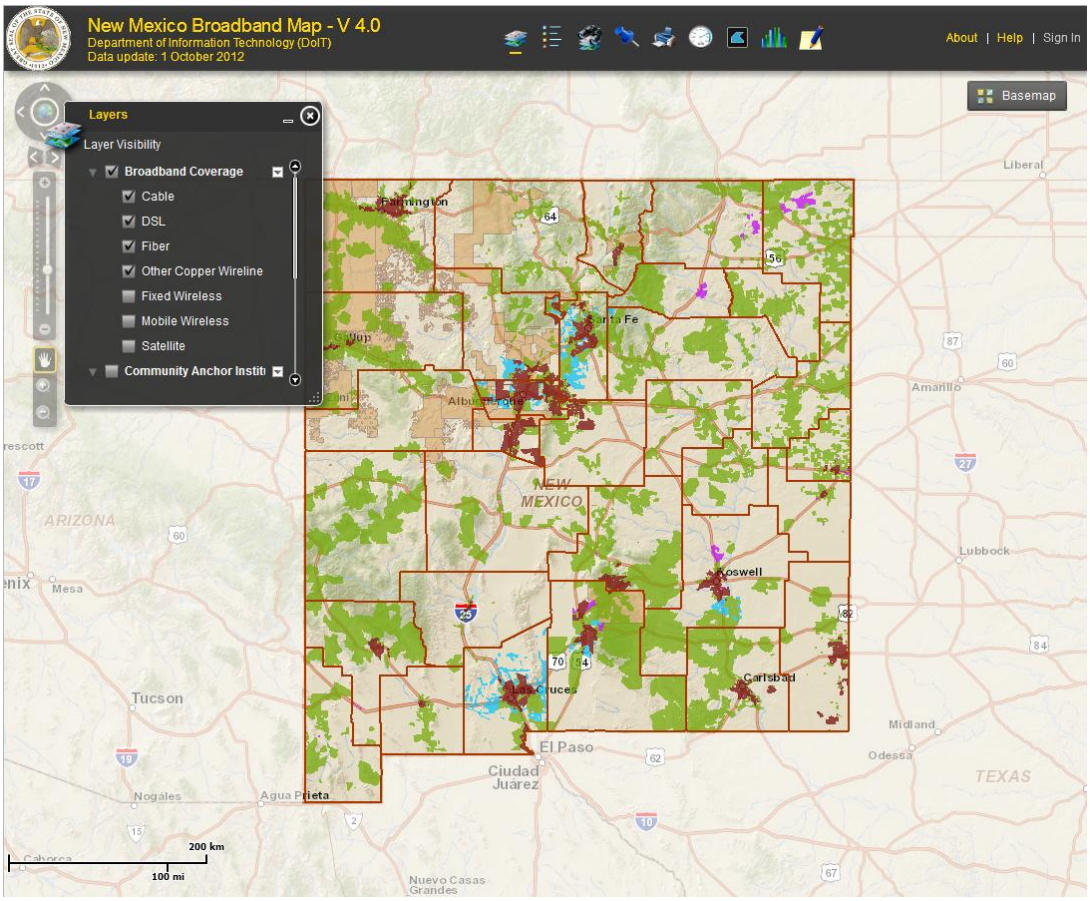


Figure 2 New Mexico Broadband Map V 4.0, www.nmbbmapping.org/mapping/; accessed 28 March 2013

Appendix A: Table of New Mexico Internet Service Providers

Internet Service Providers listed in black text were participating providers in NTIA Data Round 7. Providers listed in blue text did not respond to NTIA Data Round 7 data requests.

Identified New Mexico Internet Service Providers: NTIA Data Submittal, April 1, 2013	
Agave Broadband LLC	Time Warner Cable
AT&T Corp, Inc.	Transworld Network, Corp
AT&T Mobility LLC	Tularosa Communications, Inc.
Baca Valley Telephone Company, Inc.	TW Telecom of New Mexico, LLC
Baja Broadband	Valley Telecom Group (Copper Valley Telephone, Inc.)
Cable One	Valley Telecom Group (Valley Telephone Cooperative, Inc.)
CenturyLink	Verizon Wireless
CityLink Fiber Holdings, Inc.	ViaSat, Inc.
CNSP Internet	VSAT Systems, LLC (Skycasters)
Comcast	Windstream Communications SouthWest
Cricket Communications, Inc.	WNM Communications
Cyber Mesa Telecom	Yucca Telecom (Roosevelt County Rural Telephone Cooperative, Inc.)
Dell Telephone Cooperative, Inc.	Yucca Telecom (Yucca Telecommunication Systems, Inc.)
ENMR Telephone Cooperative	Zayo Group
Frontier Navajo Communications (Navajo Communications Company, Inc.)	Action INTELEX
Higher-Speed Internet, LLC	AmigoNet
Hughes Network Systems	Azulstar, Inc.
Kit Carson Electric	BlackRock Networks, LLC
La Canada Wireless Association	Brainstorm Internet
La Jicarita Rural Telephone Cooperative	Cnet Internet
Leaco Rural Telephone Cooperative	Desertgate Internet
Level 3 Communications, LLC	Huntleigh Telecommunications Group, Inc.
MATI Networks (Mescalero Apache Telecom, Inc.)	La Tierra Communications, Inc.
MegaPath Corporation	Lobo Internet Services, LTD.
Penasco Valley Telecommunications	MetTel
Plateau Telecommunications, Inc.	Oso Grande Communications
PTCI (Panhandle Telephone Cooperative, Inc.)	RioLink, LTD
PVT Networks	SCS Connect
Sacred Wind Communications, Inc.	SentivaNet
Sierra Communications (a subsidiary of Baca Valley Telephone)	Southwest Cyberport
Southwestern Wireless	Spinn.Net
Sprint	TaosNet, LLC
Suddenlink Communications	Tewa Communications
StarBand Communications, Inc. (Spacenet, Inc.)	Trilogy
T-Mobile	Fast Track Communications (Not interested in participation from Round 1)

Appendix B: Table of Abbreviations and Acronyms

BB	broadband
BBER	[UNM] Bureau of Business and Economic Research
CAD	Computer-aided Design
CORES	[FCC] Commission Registration System
CO/RT	Central Office/Rural Terminal
DBA	Doing Business As
dBi	decibel isotropic
DoIT	[NM] Department of Information Technology
DSL	Digital Subscriber Line
EDAC	[UNM] Earth Data Analysis Center
FCC	Federal Communications Commission
FGDC	Federal Geographic Data Committee
FRN	FCC Registration Number
ft.	foot
FTP	File Transfer Protocol
GDB, gdb	Geodatabase; Geodatabase file extension
GIS	Geographic Information Systems
HSIP	Homeland Security Information Program
HTTP	Hypertext Transfer Protocol
HTTPS	Hypertext Transfer Protocol Secure
ID	[unique] identifier
IMLS	Institute of Museum and Library Services
IPEDS	Integrated Postsecondary Education Data System
ISP	Internet Service Provider
MHz	megahertz
NCES	National Center for Education Statistics
NDA	Non-Disclosure Agreement
NGO	Non-governmental Organization
NM	New Mexico, State of New Mexico
NMBB	New Mexico Broadband [Program]
NM DoIT	New Mexico Department of Information Technology
NTIA	National Telecommunications and Information Administration
PDF, pdf	[Adobe] Portable Document Format and file extension
PSFA	[NM] Public School Facilities Authority
QA/QC	Quality Assurance/Quality Control
RCL	[NM] Road Centerlines
RDP	Remote Desktop Protocol
RGIS	[NM] Resource Geographic Information System
SBI	State Broadband Initiative

SFTP	Secure File Transfer Protocol
SHA1, sha1	Secure Hash Algorithm 1
SMB	Server Message Block
sq. mi.	square mile(s)
SWNOM	Subscriber Weighted Nominal [Speed]
TIGER	[U.S. Census] Topologically Integrated Geographic Encoding and Referencing (system)
TXT, txt	Text file extension
UNM EDAC	The University of New Mexico Earth Data Analysis Center
UPS	uninterrupted power supply
USAC	Universal Service Administrative Company
VDR	VMware Data Recovery (application)
VM	Virtual Machine
Web	World Wide Web
XLS, xls	Microsoft Excel file extension
ZIP, zip	Zipped file extension

OFFICIAL APRIL 2013 UPDATE SUBMISSION TO THE NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION UNDER THE STATE BROADBAND INITIATIVE GRANT PROGRAM FOR THE STATE OF NEVADA

April 1, 2013

TABLE OF CONTENTS

April 1, 2013

Ms. Anne W. Neville
SBI Grant Program Director
National Telecommunications and Information Administration
U.S. Department of Commerce
Room 4716
1401 Constitution Avenue, NW
Washington, DC 20230

Dear Ms. Neville:

As the State Broadband Designated Entity, in partnership with Nevada Broadband Task Force, please accept this submission from Connected Nation on behalf of the state of Nevada's State Broadband Initiative (SBI) Grant Program, known as Connect Nevada.

Connected Nation and Connect Nevada congratulate the National Telecommunications and Information Administration (NTIA) and the Federal Communications Commission (FCC) on achieving the two-year anniversary of the National Broadband Map. Truly, now more than ever, the significance of complete and validated data through this effort is impacting lives in communities all across our great country. The Connect Nevada program and its collective stakeholder community continue to be faithful and energized contributors, and we are proud to play such a part in forging the innovation economy of the twenty-first century.

The artifacts that comprise this submission should be found to be compliant with the April 1, 2013, deadline for the semi-annual data update and in accordance with the terms of the July 1, 2009, Notice of Funds Availability (NOFA) and all subsequent clarifications pertaining to delivery of state-level mapping of broadband service availability. This packet includes:

Inventory of Deliverables, Connect Nevada: April 1, 2013

NOFA Requirement	Data Transfer Model	Data Description
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in Census Blocks of No Greater Than Two Square Miles in Area
Appendix A: 1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road

		Segment in Census Blocks Larger in Area Than Two Square Miles
Appendix A: 1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address
Appendix A: 3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points
Appendix A: 4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing
Appendix A: 4	n/a	Community Anchor Institutions-Narratives
VII.A.1(a)	n/a	Accuracy and Verification Report
n/a	DataPackage.xlsx	Worksheets of Contact Information, Record Count, and Provider Summary Table
n/a	n/a	List of Changes and Corrections to the Dataset
n/a	n/a	Non-Participating Provider (NPP) Narratives
n/a	n/a	Broadband Provider Roster and Participation Status

In addition, this data update submission should be found to be compliant with the additional program requirements instituted by the National Telecommunications and Information Administration since the time of the October 2012 SBI data submission for the Connect Nevada program. Specifically, these new requirements are:

SBI Data Transfer Model

The submission of the broadband dataset for April 1, 2013, is contained within the SBI Data Transfer Model as released on the Grantee Workspace on December 14, 2012. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information on each provider as possible.

Additional Submission Guidance

On February 8, 2013, NTIA released new guidance regarding the processing of wireless data, for both fixed and mobile broadband providers. All wireless provider coverage records have been reviewed and are in compliance with this grantee guidance for this April 2013 submission period. Even providers that did not have an update for this submission cycle were reviewed and data reprocessed as necessary for those records that were not yet in compliance with the new guidance.

This submission continues to follow the speed technology guidance released by the Program Office on August 9, 2012, to review speed tier codes in correspondence with technology of transmission codes. In the October 2012 submission, descriptions were provided in the methodology paper that offered an explanation for any submitted technology of

transmission and speed combinations that were outside of the expected value range. That practice continues in this submission as technology and speed combinations are reviewed and scrutinized; any questionable information supplied by providers is reviewed more in depth with the provider to ensure the information is accurately captured or a proper explanation is provided as to why the speed information should be submitted as supplied even if it falls outside the expected value range.

This submission also includes narratives describing the data and coverage estimation of non-participating providers. While Connect Nevada continues outreach to all providers prior to each submission period, the need to submit broadband service data for all providers regardless of their participation is evident as the SBI program continues into this seventh round of data submissions. The submission of this estimated broadband service area for providers that have not supplied data to Connect Nevada is essential in being able to portray a more accurate depiction of the current broadband landscape.

This April 2013 semi-annual data update under the SBI Grant Program continues to demonstrate our dedication to implementing the joint purposes of the Recovery Act and the Broadband Data Improvement Act (BDIA) by gathering comprehensive and accurate state-level broadband mapping data, developing state-level broadband maps, aiding in the development and maintenance of the National Broadband Map, and undertaking statewide initiatives for broadband planning.

Broadband Service Availability — Provider Outreach and Verification

This data update submission under the SBI program includes datasets for 100 percent of the Nevada provider community - 60 total providers. There are 57 participating providers and 3 additional non-participating providers whose estimated coverage areas have been submitted. Of the 57 participating providers, 26 supplied an update to their network or coverage area(s), while 28 have reported no change. The remaining 3 represent providers who previously supplied data but were non-responsive in the April 2013 update effort; therefore, their previous dataset is being put forward as part of this compilation. A complete roster by provider depicting participation status and contact history is contained herein.

In addition to the facilities-based and middle-mile broadband providers tracked above, this submission contains datasets for 1 reseller that was able to provide sufficient information on their service area(s) to be included in the data transfer model.

As the aforementioned roster and attached methodology documentation will attest, it is the collective opinion of the Connect Nevada principals that all commercially reasonable efforts were made to account for 100 percent of the known Nevada broadband provider community, pursuant to this semi-annual data update submission.

Connect Nevada has also continued to perform broadband verification activities through several means. In addition to confirmation of service area(s) by each provider, Connect Nevada conducts field validation efforts. To date, 49(81.67 percent) providers have been validated through field verification activities. Additional details on verification activities are contained within the Field Validation Methodology.

The Connect Nevada website, (www.connectnv.org), continues to serve a prominent role in the outreach and data collection effort. This program asset provides a way for the general public to participate in the process by offering interactive tools for users to test their connection speed, submit broadband inquiries, or contact a program representative.

As an indicator of stakeholder penetration, the Connect Nevada website encountered 4,454 unique visits during this reporting period (18,890 total to date for the life of the grant awarded on December 20, 2009). Additionally, this pronounced Web activity netted 1 broadband inquiry over this same reporting period (45 grant inception to date). The website also provides access to the My ConnectView™ interactive mapping application, which allows consumers and broadband providers to confirm or dispute the coverage represented on the broadband inventory map. These consumer-initiated actions are facilitated through the Connect Nevada website and the Connect Nevada interactive mapping tool (My ConnectView™) that offer the stakeholders the vehicles to provide information regarding availability in their respective service area, either in affirmation or contest of the reported data represented in the Connect Nevada mapping artifacts. Since the initial data collection and release of corresponding maps, feedback in the form of broadband inquiries has allowed Connect Nevada to identify additional areas that are in need of field validation, which is scheduled as soon as possible.

Community Anchor Institutions

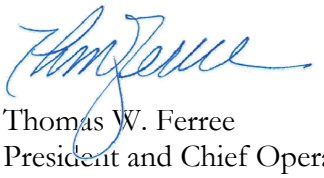
Connect Nevada continues to make significant inroads to gather data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. This uptick in CAI data collection was further supported by NTIA's outreach to grantees reiterating the importance of this outreach. With the continued commitment of the Nevada Broadband Task Force, we have continued to focus on a relationship-oriented approach with state-level agencies and organizations that generates more responses than general contact.

In conjunction with the Nevada Broadband Task Force, outreach was conducted during this data update reporting period by Connect Nevada to continue identification of existing, centralized sources for CAI connectivity data. Additionally, outreach was coordinated to distribute the CAI survey to institutions throughout the state through multiple methods including a customized online survey available on the Connect Nevada website. Building on past success of the September 2012 Education Campaign, February 2013 was recognized as Public Safety Month where the public safety sector was the focus of CAI data collection, research, and public affairs outreach. Connect Nevada has developed a number of new relationships with statewide associations, such as the Education SuperHighway, to promote the importance of broadband connectivity at anchor institutions and participation in this data collection process. The value of these relationships continues to impact the entire success of the Grant Program, and the CAI engagement is a logical extension of new and existing relationships. Connect Nevada will continue to build upon these new relationships over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

From our work in Nevada, as well as other states, we recognize the great value of this data to future collaboration efforts within the state as well as its value to the National Broadband Map. We plan to continue to bring best practices to the Connect Nevada efforts, along with an investment of both human and technical resources required to reach our goal of increasing the data that is secured and reported as part of this process.

The Connect Nevada program exists to improve data on the deployment and adoption of broadband services and to assist in the extension of broadband technology across all regions of the great state of Nevada, as well as the United States and its territories through contribution to the National Broadband Map. We look forward to the continuing work ahead and improving upon our data collection methods.

Respectfully submitted,



Thomas W. Ferree
President and Chief Operating Officer
Connected Nation, Inc.

NEVADA COMMUNITY ANCHOR INSTITUTIONS METHODOLOGY

In this seventh reporting period of the SBI, Connect Nevada, working in close coordination with the state of Nevada, has established an ongoing mechanism for gathering data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. Since the October 2012 data submission, the CAI outreach process method has been modified to improve data collection. Specifically, the outreach process is a more focused sector-specific and relationship-oriented approach that generates more responses than general contact.

Connect Nevada has continued to identify and process CAI data obtained through an ongoing statewide outreach campaign. Physical address information continues to be augmented through manual sourcing and geocoded by Connect Nevada through Esri ArcGIS software.

Connect Nevada continues to utilize a customized online survey hosted through SurveyMonkey, with a landing page on the Connect Nevada website that was developed during the first reporting period. This survey, in combination with a customized data-gathering spreadsheet, was distributed on a regular basis to a targeted list of CAI throughout the state as well as organizations and agencies that work closely with the CAI. The distributions were completed with the support of the state client. Connect Nevada will continue to use these data-gathering tools for future targeted outreach efforts throughout the coming months leading up to the next reporting period. These materials are customized to fit the CAI categories as defined in the SBI NOFA.

The survey can be accessed at this link: http://www.surveymonkey.com/s/7RSHPBS

In addition to the survey, Connect Nevada has developed a number of new relationships with statewide associations, such as the Education SuperHighway, to promote the importance of broadband connectivity at Community Anchor Institutions and participation in this data collection process. It is apparent that these relationships are beneficial to the entire success of the grant program, and the CAI engagement is a logical extension of new and existing relationships. Connect Nevada will continue to build upon these new relationships over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

In addition to fostering and building relationships with state agencies, associations, and organizations, Connect Nevada has also developed a sector-specific calendar that supports CAI outreach as well as research and communications efforts. This focused approach allows a corporate commitment to capturing CAI data in addition to developing meaningful sector-specific content. Since the October 2012 submission, the sector-specific approach included a month-long public safety campaign in February 2013. During this campaign, Connect Nevada committed to improve relationships with key stakeholders, distribute survey requests to sector representatives, and provide sector-specific education through communications and webinar resources. Outreach to and survey of hospitals, local law enforcement, and fire stations helps build awareness and establishes a centralized database of key connectivity data for planning.

Connect Nevada conducts significant research as part of an ongoing process to identify existing, centralized sources for CAI connectivity data. In tandem with these efforts to identify existing data, Connect Nevada continues to identify key CAI contacts in an effort to distribute and promote the online survey and raise awareness of the importance of CAI broadband connectivity. Also, when possible, Connect Nevada works with the Nevada Broadband Task Force to identify existing relationships that can support CAI outreach.

Connect Nevada has an ongoing mission to educate CAI throughout the state on the importance of participating in the project. Participation by these institutions will raise awareness about the importance of broadband connectivity and the need to report the requested data for inclusion on the National Broadband Map.

The greatest challenge with collecting CAI data continues to be educating the CAI about the Connect Nevada project as well as self-awareness of their own broadband connectivity (specifically upload and download speeds). Connect Nevada will continue to research key CAI organizations and agency contacts in an effort to raise awareness of this project among CAI. When applicable, the Nevada Broadband Task Force will continue to be briefed on the current CAI data and provided information so it can assist with outreach and promotion within the state.

A CAI summary of all processed and submitted data is provided below:

CAI Type	Total	Physical Address	Lat/Long	Technology of Transmission	Download Speed	Upload Speed
K-12 Schools	822	822	791	529	528	524
Libraries	108	108	100	61	64	64
Healthcare	5034	5034	4672	27	4877	4877
Public Safety	146	146	140	22	29	29
Higher Ed Institutions	81	81	72	38	39	39
Other Government	887	887	853	81	128	129
Other Non-Government	908	908	846	21	60	62
Total	7986	7986	7474	779	5725	5724

During the coming months, CAI data collection will be supported by regular reporting to the Connect Nevada team. The CAI data is proving an invaluable resource to all components of the Connect Nevada effort. The data identifies potential local champions, sector trends, and opportunities for improvement as well as opportunities to educate CAI not familiar with their current connectivity.

SBI Data Submission Methodology

The submission of the broadband dataset for April 1, 2013, is contained within the SBI Data Transfer Model and additional components as released on the Grantee Workspace on December 14, 2012. Connected Nation (CN) has reviewed all literature that relates to the release and use of this data transfer model and recognizes that it does not replace or dictate how data is stored, processed, or displayed for the state, as it is meant primarily as a means to transfer the broadband data from all states and territories and populate the National Broadband Map in a seamless fashion.
Connected Nation has complied with the following guidance documents published by NTIA:

- Technical Mapping Guide, as released on the Grantee Workspace on March 24, 2011, was followed to ensure the completeness and validity of the submission through completion steps and checklists, completing the DataPackage spreadsheet, uploading broadband datasets into the Data Transfer Model, and checking the dataset using the SBDD_CheckSubmission receipt process.
- Naming Conventions and Category of End User, as released on the Grantee Workspace on March 26, 2012, was followed to ensure the consistency of individual file and zip package naming.
- Wireless Data Processing Guidance, as sent to SBI grantees on February 8, 2013, was followed to ensure that all fixed and mobile wireless provider coverage records are submitted to NTIA as separate, closed polygons whenever there is a variation in any of the required fields.

In addition to the methodologies contained herein, the Changes and Corrections documentation, as well as the DataPackage.xls containing contact information, the data dictionary, and a provider summary table, the following feature classes are submitted within the SBI Data Transfer Model for the state of Nevada.

Inventory of Deliverables, Connect Nevada: April 1, 2013

NOFA Requirement	Data Transfer Model	Data Description
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in Census Blocks of No Greater Than Two Square Miles in Area.
Appendix A: 1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census Blocks Larger in Area Than Two Square Miles.
Appendix A: 1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address.
Appendix A: 3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points.
Appendix A: 4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing.

The provider data collected by CN on behalf of the state of Nevada have been formatted per the given specifications and uploaded into the appropriate feature classes of the SBI Data Transfer Model. Wireline availability is contained within census blocks and road segments, wireless availability is contained as polygons of coverage areas, and middle-mile connections and Community Anchor Institutions are contained as point data. All speed data is contained at the census block, road segment, or wireless polygon level of availability. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information as possible.

Connected Nation has continued outreach to satellite providers on their availability, technology, and speed information, but granular coverage is not yet available. Submitted within the wireless feature class are the satellite companies providing service to Nevada as a polygon of the state boundary. Efforts will continue to collect, process, or otherwise create more granular satellite data based on availability analyses and guidance received from NTIA. Process development continues as well to be able to create more granular satellite coverage based on satellite equipment positioning and geographic inputs.

DATASETS FOR IN-KIND MATCH

Connect Nevada received an in-kind match contribution to assist with SBI mapping goals which has been beneficial to the program in the following ways:

As part of an in-kind contribution, Connect Nevada received a dataset from the Lyon County School District containing Lyon County student records. This dataset provides statistics illustrating the number of parents who have checked on their child's progress via an online system set-up and maintained by the school. - $100.

Connect Nevada received a dataset from the state containing total population for counties, cities, and towns as part of an in-kind contribution that will be utilized by the project to assist with its mapping and planning goals. - $10,592.

Connect Nevada received a dataset from the state, containing age, sex, race, and Hispanic origin estimates and projections for 2010-2030 as part of an in-kind match contribution to assist the project with its mapping and planning goals. - $29,332.

Connect Nevada obtained a dataset containing Nevada healthcare Community Anchor Institution (CAI) data. Since the dataset was developed using federal funds, it was not valued nor was it counted as match toward the program.

As part of an in-kind contribution from the Nevada Department of Transportation, Connect Nevada received a dataset containing 2011 road segments. This was instrumental in processing the 2010 Census road data. Since the dataset was developed using federal funds, it was not valued nor was it counted as match toward the program.

As part of an in-kind contribution from the Nevada Department of Taxation, Connect Nevada received a dataset that contained all registered business locations with a sales or use tax account in the state. Connect Nevada used this dataset to create an in-depth analysis of business locations by sector and by rural/non-rural counties. This dataset will continue to be used to inform future Connect Nevada surveys and research reports. - $125,339.

NEVADA FIELD VALIDATION METHODOLOGY

CN focused a portion of its time on specific validation processes such as:

- conducting random spectrum analysis studies throughout the state using an Avcom PSA-37-XP spectrum analyzer;
- conducting mobile speed tests throughout the state using an iPhone, Android (or other smart phone) as well as provider-specific aircards (Sprint 3G/4G, Clearwire et al);
- identifying pre-selected, provider-submitted wireless transmit tower sites and cross-referencing data about that tower against the Federal Communications Commission (FCC) databases such as Antenna Structure Registration and/or the Universal Licensing System;
- cross-referencing Federal Registration Number data against available FCC Form 477 data as well as the FCC **CO**mmission **RE**gistration **S**ystem (CORES);
- validating provider submitted data (for example: latitude/longitude) using a handheld Garmin eTrex Summit GPS unit or GPS enabled software such as Microsoft *Streets & Trips*;
- locating physical wire-line attributes (such as Central Offices, Remote Terminals, CATV plant, etc.) and comparing them against provider submitted data; and
- conducting on-net and off-net speed tests using the FCC portal at http://www.broadband.gov/qualitytest/about/ or using the Ookla Net Metrics enabled speed test utility located on each of CN's program specific websites.

Additionally, CN cross-referenced numerous public documents in order to ensure that all known broadband providers were located and contacted. This included searching membership logs from trade associations (WISPA, WCAI, PCIA, etc.), the Cable Television Fact Book, Public Utility Commission records, Public Service Commission records, Chamber of Commerce, etc.

To date, Connected Nation's staff conducted on-site validation tests in Nevada on the following providers: Above All Communications (d.b.a. Express Internet); Air-Internet, Inc.; Arizona Nevada Tower Corporation; AT&T Inc.; Avant Wireless LLC; Baja Broadband LLC; CalNeva Broadband LLC; CC Communications; CenturyLink; Charter Communications; Citizens Telecommunications Company of Nevada (d.b.a. Frontier Communications of Nevada); Clearwire Corporation; Cox Communications; ETAN Industries (d.b.a. Clark Cablevision and CMA Cablevision); EZZnet, Inc.; Fort Mojave; Great Basin Internet Services; High Desert Internet Services; Highlands Wireless Inc.; Hot Spot Broadband Inc.; InfoWest (d.b.a. A & J Hardy Enterprises, Inc.; Comnett Computer Services, and Peak Internet Services); JAB Wireless (formerly d.b.a. KeyOn Wireless and Wells Rural Electric Telephone); Las Vegas Net; Leap Wireless (d.b.a. Cricket License Company LLC); Level 3 Communications; Lincoln County Telephone; Mason Valley Quicknet; Metro PCS; Moapa Valley

Telephone Company; Mt. Wheeler Power; Oasis Online Inc.; Reliance Connects (d.b.a. Rio Virgin Telephone & Cablevision); Robinson Communication Corporation (d.b.a. Oregon-Idaho Utilities, Inc. and Humboldt Telephone Company); Schatnet Internet LLC; SMS Computing Inc. (d.b.a. Performance Computing Internet); Spring Creek Wireless; Sprint Nextel; TelePacific Communications (d.b.a. Nextweb and Covad); T-Mobile USA Inc.; tw telecom; Vegas Wi-Fi Communications LLC; Verizon Wireless; Wave Direct Telecommunications LLC; WENR Corporation (f.k.a. Satview Broadband, Ltd.); Wireless Beehive LLC (d.b.a. Beehive Telephone Company Inc.); XO Communications; Yonder Media (formerly High Speed Networks-Mound House, LLC); and Zayo Bandwidth LLC.

In addition to the field verification tests that have been conducted, Connected Nation has also conducted desktop research and/or work in the field to collect information for the non-participating providers, Spring Creek Wireless and Mason Valley QuickNet, which, by nature of the methodology required for this collection, are also included in the above list.

From program initiation through this reporting period, CN has completed in-the-field validation testing against 49 companies (out of a universe of 60 viable providers) totaling 81.67 percent within the state of Nevada. This percentage also considers the non-participating provider record submitted to NTIA as may be contained herein (see "Data Submission and Coverage Estimation of Non-Participating Provider" below).

CN has also continued to review provider datasets for accurate speed information, platform listings, and other intricacies that may fall outside of the standard SBI Data Transfer Model parameters, as published on the NTIA Grantee Workspace on December 14, 2012. Any providers whose submitted coverage and attributes are anticipated to come into question have been further reviewed and confirmed; details on a case-by-case basis are presented below.

CalNeva Broadband, LLC
Issue: Technology of transmission code 40 with maximum advertised download speed in tier 4, lower than expected value range for the technology.
Resolution: Provider representative confirmed that service area is DOCSIS 3.0, but lower speeds are still in use.

DATA SUBMISSION AND COVERAGE ESTIMATION OF NON-PARTICIPATING PROVIDERS (NPP)

As part of its ongoing broadband mapping efforts, CN has developed a series of processes with the goal of submitting coverage estimation mapping data to NTIA for every known and qualifying last-mile broadband provider, regardless of platform type (cable modem, DSL, fixed wireless, etc.). Appendix A presents full reports on the estimated broadband service territory for the providers in this state that have either been non-responsive or that have refused to participate in the SBI mapping initiative as of April 2013. These coverage estimation reports are for non-participating providers whose data has not been previously submitted to NTIA in past mapping cycles.

The section below provides a summary of the status of CN's outreach and findings on all non-participating provider coverage for the April 2013 SBI submission.

Avant Wireless
The coverage estimation for Avant Wireless was not updated from the previous submission in October 2012. The full white paper containing the most recent coverage estimation for this provider can be found within the October 2012 submission to NTIA.

Mason Valley Quicknet
Coverage for this NPP is being submitted for the first time; please find white paper on provider outreach and coverage estimation in Appendix A.

Spring Creek Wireless
Coverage for this NPP is being submitted for the first time; please find white paper on provider outreach and coverage estimation in Appendix A.

PROVIDER VALIDATION METHODOLOGY

Broadband providers maintain their service area data in many different formats, all in varying levels of complexity and granularity. In order to ensure that the data required by the NTIA is standardized across all providers and that it is as accurate as possible, CN translates and formats the data that providers are able to supply into a GIS shapefile and produces maps for the provider to review. The resulting map(s) and review process allow for providers to see their service area in a geographic format – for some providers, this is the first time they have seen maps of their broadband service area. Having the mapped service area allows providers to quickly identify any issues that appear in the data representation, whether the issue is in the data translation into a GIS format or from the original data collection and submission. Often data is provided from various sources and through the review and revision process, local engineers who operate the networks and work in the field are able to ensure that the tabular data that has been submitted is accurate and represents the real-world network extent. Any issues in how the service area is represented on the map(s) are remedied by CN, whether they are additions, removal of service, or any other revisions. Revised maps of service area representations are sent to the provider for review and approval; CN will revise data and return maps as many times as necessary until the provider is in agreement that the map represents their service area as accurately as possible. Once the review process has been completed and final approval of the data is provided, the data is deemed ready for NTIA submission.

Once the data collection has been aggregated at a statewide level, static maps of statewide and county-level availability are produced and made publicly available. In addition, consumers can visit the interactive online tool, My ConnectView, to create customized views of broadband service areas and analyze corresponding demographic information. Leveraging broadband service data on various platforms allows for public users, providers, and other stakeholders to review, scrutinize, and provide feedback on the represented data. This feedback becomes a validation method in itself, as consumers submit inquiries to CN either affirming where service is not available or identifying areas where broadband service is shown on the map, but in actuality is not available. This allows for a

follow-up to providers regarding revisions to the data as it is represented; it also allows for CN to identify locations where on-site visits may be necessary to complete field validation of available services. Public feedback on all forms of mapping products serves as a localized validation method for provider-supplied information and allows CN to resolve inaccuracies as they are identified to ensure that only the highest quality information is provided to stakeholders.

Additionally, non-participating provider narratives that were submitted in previous mapping cycles are subjected to the same level of scrutiny. Occasionally, a provider may elect to voluntarily participate (thus eliminating the need for future data estimation activities in the field). However, more often than not, the NPP narrative is updated with a combination of data gleaned from the provider's website, data obtained through FCC research and/or data collected/verified in the field by a CN staff engineer.

Estimates derived from provider-validated data indicate that approximately 0.89 percent of Nevada households do not have terrestrial fixed broadband service available, and approximately 0.28 percent of Nevada households have neither mobile nor fixed broadband service available.

Within rural areas of the state, results derived from provider-validated data indicate that approximately 4.89 percent of rural Nevada households do not have terrestrial fixed broadband service available, and approximately 0.48 percent of rural Nevada households have neither mobile nor fixed broadband service available. Please note that the availability estimates presented are based on Census 2010 household information.

The estimates above, in accordance with NTIA's definition of available broadband service as specified in the SBI NOFA, include broadband service with download speeds of at least 768 Kbps and upload speeds greater than 200 Kbps.

In addition, due to the nature of the SBI data collection methodology as defined by the NTIA and based on both census block geographic units and street segment data, the estimates of broadband availability derived from provider-validated data may include an overstatement of the actual number of households with broadband availability. Under the census block-based data collection method, a provider will typically report broadband availability for an entire census block whether its network is present across the whole or only a subset of that census block. This potential overestimation at the census block level can be amplified as the data is aggregated across the entire state.

WIRELESS METHODOLOGY

Broadband Service Availability in Provider's Service Area
Wireless Services Not Provided to a Specific Address

Data solicited from a fixed wireless provider to create propagation models include, but are not limited to:

1. The name of the structure.
2. Whether the transmitting device is operational or proposed.

3. The maximum advertised downstream speed, the maximum advertised upstream speed.
4. The typical downstream speed, the typical upstream speed (peak periods for both).
5. The frequency range of spectrum being used (as prescribed by NTIA). This may include (but is not limited to) spectrum authorizations identified within the Federal Communications Commission (FCC) Universal Licensing System (ULS) database or located on the FCC's Spectrum Dashboard. This research often proves to be exceptionally effective when estimating the coverage area of an NPP.
6. The primary population center(s) being served (for geopolitical boundary reference).
7. The physical address of the transmit site (in the event latitude/longitude is unavailable from the provider this allows a quick reference point for geocoding).
8. Latitude in either Degrees, Minutes, and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
9. Longitude in either Degrees, Minutes and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
10. Antenna pattern (e.g. omnidirectional, 180°, 120°, 90°, etc.).
11. Azimuth of antenna (e.g. 360° with magnetic declination if known).
12. Approximate transmit radius (in feet, miles, or kilometers).
13. Polarity of transmit antenna (Vertical or Horizontal).
14. Transmit antenna gain (in dBi).
15. Line loss (applicable only to providers using coax, heliax, waveguide or other forms of cabling – excludes power-over-Ethernet devices).
16. Mechanical and/or Electrical beam tilt (if applicable).
17. Equipment Manufacturer (allows easy cross-reference against manufacturer's specification sheet).
18. Power output of the transmitting device (if unknown, FCC standards or manufacturer specifications are applied).
19. AMSL at base of tower site.
20. Antenna centerline AGL (height of antenna above ground level measured at the centerline of the actual antenna).
21. Foliage factors (Evergreens/Deciduous and percent of ground cover).
22. Ground Clutter (primarily used in rural areas to account for foliage and in metropolitan areas to account for types and heights of buildings if known).
23. Average gain of receive antenna.
24. Receive antenna is estimated at height above average terrain (HAAT) of 6.2 meters/20 feet.
25. Federal Registration Numbers (if applicable) which may allow opportunities to cross-reference and/or obtain additional data from the FCC's ULS and the **CO**mmission **RE**gistration **S**ystem.

Propagation modeling combines scientific data and empirical mathematical formulation for the characterization of radio wave propagation as a function of frequency, distance, and other conditions. Propagation software(s) typically use the Irregular Terrain Model (also known as Longley-Rice) of radio propagation for frequencies between 20 MHz and 20 GHz. This model is based on electromagnetic theory and statistical analyses of the combination of terrain features and radio measurements, then predicting the median attenuation of a radio signal as a function of distance and the variability of the signal in time and in space. For metropolitan areas, the software can typically be adjusted to use the Okumura-Hata model, which accounts for predicting the behavior of cellular transmissions in areas where buildings are the primary obstructions. The resulting product from either model depicts a graphical illustration of the theoretical propagation characteristics of a selected frequency range based on defined variables (receiver sensitivity of the home/mobile device, foliage factor, and digital elevation terrain input).

After converting propagation models into a geospatial format, additional processing is completed to remove the small pixels representing service present in the resulting dataset. These areas are initially created based on the parameters entered in the software from the provider equipment information, the underlying data parameters of elevation, hill shade, etc., and the limitations of the software itself to display a broadband service area as accurately as possible. Generally, these random pixel striations appear as a result of signal levels reaching the highest elevated points within the prescribed radius. Typically, while this pixilation anomaly shows legitimate areas where signals can be received, these highly elevated points may have exceedingly sparse populations or are entirely void of population. As a result, and congruent to the *Wireless Technology Methodologies and Business Logic* white paper submitted to NTIA on January 20, 2011, all independent pixels representing service that are less than 0.125 square miles in area have been removed from the geospatial representation of each wireless provider.

BROADBAND INQUIRIES METHODOLOGY

CN collects consumer feedback in the form of broadband inquiries (BBIs). These inquiries represent any type of communication received from the public regarding broadband service. Once BBIs are received across the state, this information is overlaid with the broadband availability information which was collected through the SBI program. This allows for a real-world comparison of the broadband landscape to the information received from broadband inquiries. Consumers submitting these inbound comments and/or inquiries are able to provide information regarding five categories: 1) residents who do not have broadband but want it; 2) residents who have broadband but want a different provider; 3) residents who do not have broadband, but the broadband inventory maps indicate that they do; 4) residents who have broadband but want a faster connection speed; and 5) residents who have broadband but want a less expensive service option.

BBIs are submitted frequently by consumers via the Connect Nevada website. Inquiries often seek help to identify local broadband provider options, or to learn when a specific provider may be able to provide service to that consumer. Consumer comments also provide information which may help modify maps with actual service area information. The primary objectives of CN regarding these inquiries are 1) to improve the accuracy of the state maps with submitted consumer

information and follow-up field research; 2) to provide broadband options to consumers through cooperation with mapped providers and by facilitating new broadband service options; and 3) to map and analyze information from consumers about areas of unmet broadband demand and alternatives to currently mapped services. A prime example of the second option is the utilization of the Rural Utility Service satellite eligibility tool. By simply entering the consumer's address, the CN engineer can quickly determine if the consumer meets the initial qualification status for BIP satellite subsidies.

New BBIs are assigned to either the GIS department or the Engineering & Technical Services (ETS) team depending on the category entered by the consumer on the website submission form. The GIS or ETS team members respond to each inquiry according to the information entered by the consumer. Many BBIs can be resolved through desktop research; however, if a BBI requires research in the field, the assigned ETS team member conducts such research when performing field validations in the area of the inquiry, or at another such time as is practical and appropriate. GIS and ETS team members respond to and conclude BBIs via telephone contact and/or e-mail communication.

The broadband inquiry process has been implemented in each of the CN state programs with successful results. Altogether CN has received over 18,839 broadband inquiries since 2007, allowing the state programs to evaluate each inquiry for broadband demand and data verification. These inquiries are continuously examined against current broadband availability, updated every six months, to determine if previously unserved households have been expanded to and can now receive broadband at their residence. This database of broadband inquiries has also allowed the CN state programs to aggregate demand in concentrated areas to show providers the exact locations where the population has made it clear that they would purchase broadband if it was made available to them. Providers in the states have responded to this process and have expanded to areas knowing that their investment will be worthwhile. Data verification methods have also proven successful, as the state programs have been able to show those inquiries that indicate the broadband service areas are misrepresented on the map to providers, who then verify where service cannot reach in regard to that residence(s). The broadband coverage in these states has been altered to create a more accurate map based on the inquiries submitted by the public.

During this reporting period, the Connect Nevada project has received 1 inquiry (45 grant inception to date). As more inquiries are submitted to Connect Nevada, a more thorough validation of the broadband landscape can be performed, while also allowing providers to see which areas have a high demand for broadband adoption.

MY CONNECTVIEW METHODOLOGY

My ConnectView is an interactive online mapping tool for viewing, analyzing, and validating broadband data. Developed using Esri's ArcGIS for Server and Adobe's Flex Framework and hosted and maintained by Connected Nation, My ConnectView is a multi-functional, user-friendly way for local leaders, policymakers, consumers, and technology providers to devise a plan for the expansion and adoption of broadband.

First and foremost, My ConnectView allows consumers to locate their residence and identify providers that offer broadband Internet service to that location. The interactive platform allows for users to build and evaluate broadband expansion scenarios using a wealth of data, including several coverage analysis layers, speed analyses, Community Anchor Institutions, and tools to search and export household demographic information, as well as extract data in GIS, spreadsheet, and/or PDF formats.

My ConnectView also features more interactive data layers and additional tools than ever before to allow the consumer to explore the broadband data. My ConnectView provides consumers with the ability to print, e-mail, and provide feedback on the broadband data displayed on the interactive map. Through the collection of this feedback, a visual demand for broadband is presented. This visualization allows the CN state programs the ability to validate the broadband availability for accuracy. If residents within a region state they are without broadband, but the interactive map shows otherwise, this allows CN to approach the providers within that area in an effort to trim down their coverage to more accurately represent real-world availability on the ground.

The Connect Nevada project launched My ConnectView on April 2, 2012, and has received 522 visits this reporting period; to date the interactive mapping application has received 3,266 visits.

SPEED TEST METHODOLOGY

The 447 speed tests that are represented in the Connect Nevada Speed Test Report during this reporting period (1,652 grant inception to date) are the result of a partnership between CN and Ookla Net Metrics. Utilizing this relationship increases the level of confidence in the data being collected and provides for a far greater sample size than could be collected by a single testing site.

Ookla owns and operates Speedtest.net, as well as develops and deploys speed tests, such as the Connect Nevada speed test website, for partners around the world. This network of sites that is developed and run on its testing technology provides Ookla with a vast dataset that, due to the variability of geographic information collected across the varying speed test sites, is geocoded utilizing Geo-IP technology. This technology allows for tests to be geocoded to points of aggregation, typically larger nodes across provider networks. While there are hundreds of thousands of tests that have been conducted, the level of aggregation is only sufficient for county-level detail due to the test results being located at these larger nodes and not at an absolute location for each speed test.

In an effort to validate broadband data from the Connect Nevada project, speed test information is collected throughout the state. Speed tests provide speed information on the path taken through all networks (a provider's network as well as additional networks) a local machine must connect to in order to reach the host test. The benefit of this collection of speed information is two-tiered. First, it allows for a comprehensive dataset of speeds, while also providing Connect Nevada with the information on where broadband services are available. Second, unlike theoretical speed

information which may be received through the data collection process, the use of speed tests provide real-world information on the speeds that currently exist within the state of Nevada.

PROVIDERS DEEMED NON-VIABLE

The following list of companies represents the remainder of the broadband provider universe that was originally identified as complete for outreach to begin for the State Broadband Initiative. These providers are not included in the Data Package for the April 2013 submission because they have been deemed non-eligible under the parameters and guidance of the SBI grant program. This list of companies includes, but is not limited to: providers offering service but below the current definition of broadband, those that have gone out of business, technology consulting firms, infrastructure or network construction companies, non-facilities based general resellers, etc.

	Company Name	URL	Comments
1	21Globe, Inc.	www.21globe.com/is/access/	General Reseller of DSL and backhaul.
2	360networks	http://www.360networks.com/	Acquired by another company.
3	650Net	www.650net.net/	Dial-up only except CA DSL Reseller.
4	A & J Hardy Enterprises, Inc.	http://comnett.net	Acquired by InfoWest.
5	A 007 Access	www.a007.com/	D.B.A. of Cyberonic Communications Inc. reselling DSL and mobile wireless; general reseller of Quest DSL and mobile wireless; DSL does not qualify as the max advertised speed is 768 kbps x 128 kbps.
6	A-1 Vegas.com	www.zekes.com	dba Zeke's Internet Service resells Qwest DSL.
7	AAA Internet Service	n/a	No longer in business.
8	Aaccess Network Communications	www.aaccess.net/	Not a broadband provider; provides services for business IT, home computer, web design.
9	Access123.net	n/a	No longer in business.
10	ACERX.NET	www.acerx.net/	General reseller of cable, DSL, and satellite broadband access.
11	ACI, Inc.	http://www.aci.net	Reseller; unresponsive to multiple attempts to gather data.
12	ACS Wireless	n/a	No longer in business.

13	Advanced Communications Integration	http://www.aci.net/	Company is currently not a viable provider.
14	Airewaves Broadband, LLC	n/a	No longer in business.
15	Airmail247.com	www.airmail247.com/	Business mailing list search site; not an ISP.
16	American Wireless Networks, Inc.	n/a	American Wireless does not provide broadband access in Nevada. The company is out of business.
17	Amigo.Net	www.amigo.net/cms/	Qwest reseller in Alamosa, CO offering fixed wireless in CO and NM.
18	Antioch Wireless Broadband	n/a	Resells DSL and cellular service in Antioch, IL only.
19	Arrowheadnet.com	www.arrowheadnet.com/	Domain registration and web-hosting company.
20	ATEK Communications	www.atekcommunications.com	Not an ISP; ATEK is a national data contractor specializing in structured data cabling and fiber optic distribution designs and installations.
21	bargainisp.net	www.bargainisp.net/	Generic web directory site; company does not offer broadband.
22	Big Kahuna Network	n/a	No longer in business.
23	Broadband National	www.broadbandnational.com	Nonfacilities-based general reseller of DSL and satellite for 36 companies (e.g. ACC Business, HughesNet et al.).
24	CAC MediaNet, Inc.	www.cac.net/	DSL reseller; d.b.a. First Step.
25	California Broadband Cooperative, Inc.	www2.ntia.doc.gov/grantee/california-broadband-cooperative-inc	$81 million BIP/BTOP grant to construct 10 Gbps middle mile fiber network that would mainly follow U.S. Route 395 from Carson City to Topaz Lake; project 5% done as of 8/11 report.
26	Camino-Net Internet Services	www.camino-net.com	Reseller; no longer in business; was dial-up only.
27	CCIS.net	www.ccis.net	Verizon reseller in DE and NJ.

28	Celito Communications	www.celito.net/	Raleigh, NC company supplying tech services to businesses (networks, VoIP, and broadband access) in North Carolina.
29	Cheetah Wireless Technologies, Inc.	www.cwti.us/cheeweb/homepage/	LV.Net has assumed CWTI's assets and is operating its networks.
30	Cleartouch.Com	www.cleartouch.com/	Reseller of DSL and cable and mobile wireless broadband for various national providers.
31	Clover Cable	n/a	Not an ISP; cable television line construction in Las Vegas, NV.
32	Colorado River Internet	n/a	No longer in business.
33	Comtech Communications Systems	www.comtechlv.com	Not an ISP; business telephone systems.
34	Connecting America	www.coam.net/	Dial-up ISP.
35	Corridor Communications	www.corridorcomms.ca	URL redirects to http://www.cciwireless.ca/, a Canadian company providing broadband access to Alberta.
36	Cyberonic Internet Communications, Inc.	http://www.cyberonic.com/	Reseller; A 007 Access (above) is d.b.a. of Cyberonic.
37	Deltaforce	www.deltaforce.net	Dial-up provider located in Raleigh, NC.
38	deluxehost.com	www.deluxe-host.com	Offers web hosting only.
39	DGUI	www.dgui.com/	No longer in business; domain name for sale.
40	Dial National	www.dialnational.com/	Inactive URL; out of business.
41	Dialer.net	www.dialer.net/internet_access/United_States.html	International reseller of dial-up and 3G wireless reseller.
42	DSL @ Interlync	www.interlync.com	Reseller of business DSL, T-1 and wireless.
43	DTS-NET.COM	www.dts-net.com/	Reseller; provides wholesale and retail telecommunications services.
44	e-Care Nevada, Inc.	http://ecarenevada.com	Not an operating company; a management company.
45	Elko Broadband	n/a	No URL found; no info.

46	estream Wireless	www.estreamwireless.net/	Reseller; no longer in business.
47	ETI LLC	www.cyberenet.net/	General reseller of DSL services from infrastructure owned by Verizon, AT&T, and Covad.
48	Exwire	www.exwire.com/	Wi-Fi hotspot network where Exwire customers can easily access the Internet at several cafes, ski resorts, and other convenient public locations throughout Truckee and Lake Tahoe with Wi-Fi enabled devices.
49	Fast Dependable Access	www.fda.net/	No longer in business.
50	Go Mango Technologies	n/a	Can find no evidence that Go Mango is a company providing broadband in Nevada.
51	Hubwest Protected Networks LLC	www.hubwest.com	Dial-up and web hosting only; not a WISP; merged with Southwest Cyberport.
52	Imbris, Inc.	www.imbris.com	Broadband referral site.
53	IMGISP.NET	www.imgisp.net/	Broadband referral site.
54	In the Air Data	n/a	No URL found; no info.
55	Incredible Networks	n/a	No URL found; no info.
56	Inercom Communications Inc.	www.inercom.com	No longer in business.
57	Integra Telecom	http://www.integratelecom.com	Facilities-based B2B provider of communication and networking services in the western United States.
58	Interactiveinfo.com Inc.	www.rocketbroadband.com	Redirects to drumbeatnetworks.com, a Buffalo, NY company designing, developing, and managing the network infrastructure; offers cable television services in NY only.
59	iRadical	n/a	No URL found.
60	Ironwood Communications	www.ironwoodcommunications.com	Direct TV.
61	ISPartner.net	n/a	No URL found.
62	Jenco Speed Web	www.jencospeed.net	Ohio WISP only.
63	Jetstream Wireless	n/a	No URL found.

64	LANwaves	n/a	No longer in business.
65	LARIAT.NET	www.lariat.net/	WISP in Wyoming only.
66	LCSisp.com	www.lcsisp.com/index.cfm	National dial-up only.
67	Light Link Broadband	www.light-link.net/	Redirects to www.digis.net, a provider of fixed wireless broadband internet in Utah.
68	Lightyear Network Solutions, LLC	www.lightyear.net/	Telecommunications network company.
69	LinkAmerica.Net	www.linkamerica.net/	Shopping site.
70	MainBoard	www.mainboard.cc/internet.htm	VA-based computer store; general reseller; not a WISP.
71	Maine Cable and Wireless	www.mainecableandwireless.com	Broadband referral site.
72	Marcin Company	n/a	No URL found; no info.
73	Millenicom Inc.	www.millenicom.com/internet_access.html	Resells mobile wireless on Sprint network EVDO cards.
74	Nanomega.Com	www.nanomega.com	Redirects to GoDaddy; out of business.
75	Nanosecond, Inc.	www.nanosecond.com	Provides computer repair, website design, website hosting, SEO, e-mail, and technology consulting.
76	Net Nevada	www.netnevada.net/	D.B.A. Intuitive Logic, providing IT management and consulting and solutions including colocation, remote network backup and monitoring, shared server hosting, and bandwidth aggregation.
77	NetAccess, Inc.	www.nas.net/	Not a WISP; business portal site.
78	Netriplex	www.netriplex.com/	Data center.
79	NetSpeed Online	www.netspeed-online.net	No URL found; no info.
80	NetVoice	www.netvoice.net/	VoIP search site.
81	Nevada Comstock Communications, LLC	nevadacomstock.com	Phone systems.
82	Nevada Hospital Association	www.nvha.net/	Not a broadband provider.
83	Nevada Telecommunications Association	www.nevtelassn.org	Not a broadband provider.

84	Nextlink Wireless, Inc.	www.nextlink.com	Acquired by XO Communications.
85	NextWeb, Inc.	n/a	Acquired by another company.
86	Northwest ISP	www.northwestisp.com/	No longer in business.
87	NuTel Broadband Corporation	www.nutelbroadband.com/	No evidence that this company offers broadband services in Nevada; it appears that this company was extremely vocal in 2006 then disappeared.
88	Overarch Broadband	www.overarch.com/	Broadband access in Idaho.
89	Pacific Internet Exchange	www.pie.us/, www.pacificinternetexchange.com	URLs not active; no longer in business.
90	Paknet Limited	www.ptcl.com.pk/pd_content.php?pd_id=279	Subsidiary of Pakistan Telephone Company; no USA services.
91	Planet Online	www.planetonline.net/	Offers website hosting services.
92	PremoWeb	www.premoweb.com/about_us/contact_us.html	URL inactive, out of business.
93	PrimeVision Communications, LLC	www.myprimevision.net	URL inactive, out of business.
94	Priority Wire & Cable	www.prioritywire.com	Not an ISP; priority wire and cable is a distributor of wire and cable serving electrical, utility, telecommunications, mining, and welding wholesale distributors.
95	Pyramid Lake Paiute Tribe	n/a	Not operational, BIP/BTOP funded project to deploy fiber-optic middle mile network across 742 square mile reservation.
96	Pyramid Net	http://www.pyramid.net/	Offers service, but below broadband threshold.
97	Rapid Cable	n/a	Rapid Cable was recently acquired by CalNeva Broadband in December 2008.
98	Renaissance Networks	www.renaissancenetworks.com/	IT support company based in New Mexico; not a WISP.

99	Sierra Internet Services, Corp.	http://www.sierranv.net/	Reseller of DSL services.
100	Silver State Internet	www.ssinternet.net	URL inactive; out of business.
101	Simply Dialup A Metrogeek Company	www.simplydialup.com/	Dial-up only; not a broadband supplier.
102	Sky Technologies, Inc.	www.skyforall.com	Dish network reseller.
103	SkyBridge Wireless	n/a	Not an ISP; renamed SkyBridge Technology Group; acquired aviation business.
104	Sling Broadband	www.slingbroadband.com/	Florida WISP.
105	SONNET Networking, LLC	www.sonnet.com/	California WISP.
106	Sparkplug Las Vegas, Inc.	www.airband.com/	Provides fixed wireless broadband to businesses.
107	Speakeasy, Inc.	www.speakeasy.net/	Business phone systems; not an ISP.
108	StarNetWX	www.starnetinc.com/	Dial-up and VoIP.
109	Surferz.Net	www.surferz.net/	Dial-up in upstate NY only; not a WISP.
110	Switch Communications Group LLC	www.switchnap.com/	Colocation; NOC services.
111	T1 Shopper	www.t1shopper.com/	Search engine for general reseller.
112	The-OnRamp.Net	www.the-onramp.net/	Access provider below NTIA definition.
113	Total Access Networks, Inc.	www.totalaccess.net	Fixed wireless provider in Elgin, TX.
114	TSISP.NET	www.tsisp.net	Shopping site.
115	U.S. TELEPACIFIC CORP	www.telepacific.com	Acquired by MegaPath.
116	UNEV Communications, Inc.	n/a	UNEV (Lovelock) does not offer Internet Access.
117	United Cable Management, Inc.	n/a	Out of business March 2011.

118	University Corporation for Advanced Internet Development	www2.ntia.doc.gov/grantee/university-corporation-for-advanced-internet-development	Currently ineligible under the parameters and guidance of the SBI grant program.
119	UNUM Telecommunications, Inc.	www.utinet.net/	URL inactive; out of business.
120	USA Airnet, Inc.	www.usaairnet.com	URL inactive; out of business.
121	Velocitus	www.velocitus.net	URL inactive; out of business.
122	Verde Communications	www.sparkplug.net/	Acquired by Sparkplug in July 2007.
123	Washoe Weblinks	www.washoeweblink.com	URL inactive; out of business.
124	Wireless Roanoke, Inc.	www.wirelessroanoke.com/	URL inactive; out of business.
125	Wireless TelCorp, Inc.	www.wirelesstelcorp.com/	Fixed wireless provider with offices in TX, NV, and NC.
126	Wireless Think Tank	www.wirelessthinktank.com/	URL inactive; out of business.
127	wisbin	www.wisbin.com/	Wisconsin ISP resells DSL.
128	www.AmericanAngel.us	www.americanangel.us/	URL inactive; out of business.
129	YEYZOO.NET	www.yeyzoo.net/	URL inactive; out of business.
130	YLISP (Your Local ISP)	www.itsyournet.com	Provider inactive; no longer in business.
131	YourT1Wifi.com	www.yourt1wifi.com/	Providing service In Idaho, Washington, and Alaska.
132	ZOOM Internet Services, LLC	n/a	Acquired by another company.

APPENDIX A: ESTIMATION OF NON-PARTICIPATING PROVIDERS

Mason Valley Quicknet

Spring Creek Wireless

MASON VALLEY QUICKNET LLC

As part of its ongoing broadband mapping efforts, Connected Nation (CN) has developed a series of processes with the goal of submitting mapping data to NTIA for every known and qualifying last-mile broadband provider, regardless of whether the provider has chosen to support and participate in the State Broadband Initiative (SBI) mapping program.

The following narrative provides detail regarding the recent data collection activities related to Mason Valley Quicknet (MVQ), a wireless Internet service provider (WISP), located in Yerington, NV, with a service area around Yerington, Nevada. The narrative will include information regarding how and where CN obtained publicly available data and the on-the-ground due diligence, verification and validation techniques that support the underlying data.

Background

CN staff members have continued trying to obtain the participation of the provider with 17 instances of communication via telephone and e-mail sessions since July 7, 2012, through February 28, 2013. No response has been received from a company representative.

The Issue

MVQ, by its lack of responsiveness since July 7, 2012, has predicated its unwillingness to participate in the Connect Nevada broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN began building a file based on research information and, as time progressed, enriched the file with information obtained through the public domain. For example, CN reviewed the provider's website (http://www.mvqn.net/joomla/index.php) to determine the residential service plans **(Exhibit A)** and the service area **(Exhibit B)** of the provider's wireless network. A search for a Federal Registration Number (FRN) on the FCC **CO**mmission **RE**gistration **S**ystem (CORES) system yielded an FRN of 0018906461 **(Exhibit C)** with contact information relative to the owner of the company. Also, to support field validation of potential transmit sites and wireless access points, the FRN was referenced against the FCC Universal Licensing System (ULS) to identify any authorizations that the provider may hold for spectrum or leasing arrangements which could possibly enhance locating active transmit sites and wireless access points for the service area. This process yielded a 3650 MHz authorization for Station WQPY563 **(Exhibit D)**, with one unique location.

Exhibit A: MVQ Service Plans

How much will my internet service and equipment cost?

Installation & Equipment (One-Time)				
Standard Wireless Equipment[1]			$	300.00
Standard Installation & Configuration[2]			$	100.00
Additional Equipment (As Needed)[3]				
Linksys 4-Port Switch			$	40.00
Linksys Wireless Router with 4-Port Switch			$	100.00
Linksys Wireless Access Point			$	80.00
Internet Service (Monthly)				
Economy	384Kb/s	384Kb/s	$	40.00
Basic	512Kb/s	512Kb/s	$	50.00
Standard	768Kb/s	768Kb/s	$	75.00
Professional	1,024Kb/s	1,024Kb/s	$	100.00
Business	1,536Kb/s	1,536Kb/s	$	150.00
Corporate	2,048Kb/s	2,048Kb/s	$	200.00
Executive	3,072Kb/s	3,072Kb/s	$	300.00

Exhibit B: MVQ Service Area (Mason Valley and Smith Valley)

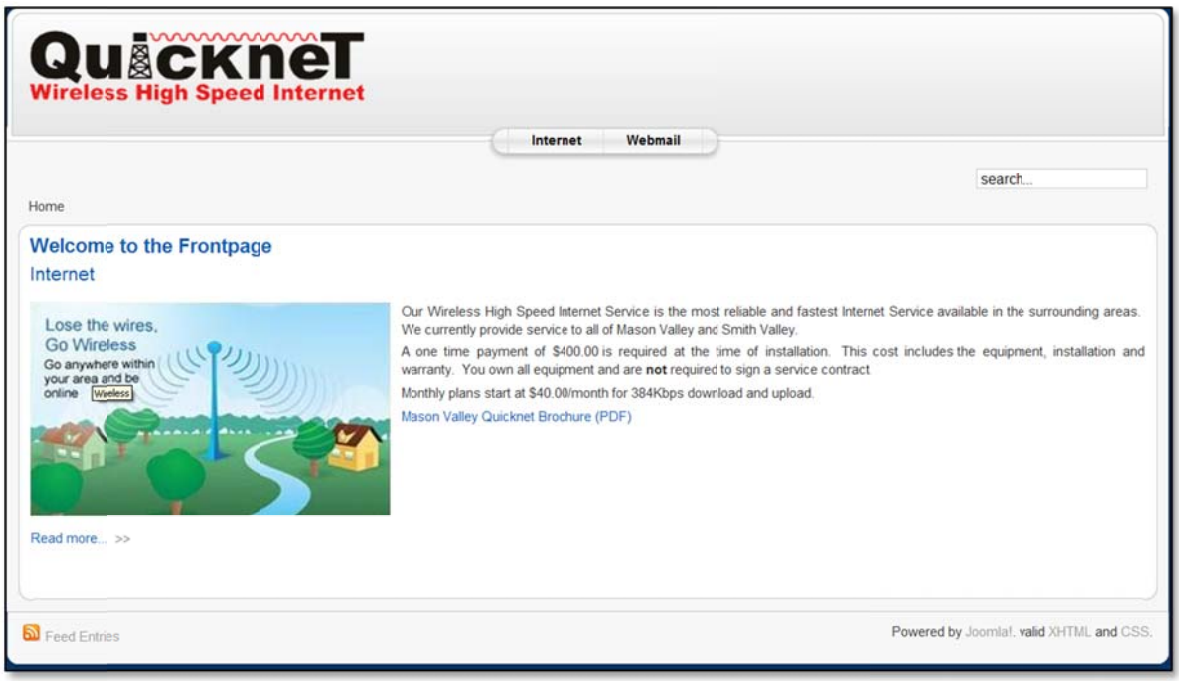


Exhibit C: Federal Registration Number

Registration Detail	
FRN:	0018906461
Registration Date:	06/29/2009 02:08:00 PM
Last Updated:	
Business Name:	Mason Valley Quicknet, LLC
Business Type:	Private Sector , Limited Liability Corporation
Contact Organization:	Mason Valley Quicknet
Contact Position:	Manager
Contact Name:	Mr Ryan N Spaeth
Contact Address:	235 North Main Street Yerington, NV 89447 United States
Contact Email:	rspaeth@mvqn.net
ContactPhone:	(775) 463-7510
ContactFax:	(775) 463-7520

Exhibit D: WQPY563 License Reference

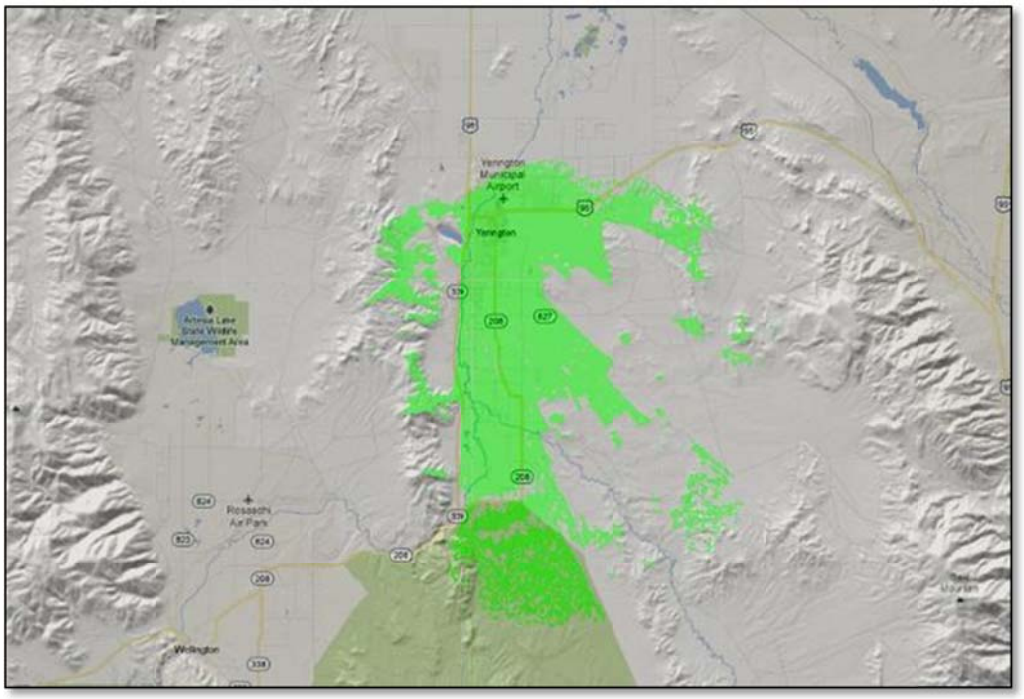
MAIN | ADMIN | LOCATIONS

Call Sign	WQPY563	Radio Service	NN - 3650-3700 MHz
1 Total Location Return to Locations Summary			
1. Site Yerington Water Tank			
ASR Number			
Transmitter	38-59-57.7 N, 119-11-12.0 W	Support Structure Type	TANK - Any type of Tank (Water, Gas, etc)
City	Yerington	State	NV
County/Borough/Parish	LYON		
Elevation of Site AMSL	1362.0 meters	Overall Height AGL Without Appurtenances	14.0 meters
Overall Height AGL With Appurtenances	18.0 meters		
NEPA Required	No		
Quiet Zone Notification Date		Quiet Zone Consent	
Has an agreement with the grandfathered satellite earth station been negotiated?	No		
Special Conditions	None		
Antenna Data			
Manufacturer	Ubiquiti	Model Number	AirMax Sector 3G-120-18
Gain	18.0 dBi	Beamwidth	120.0 degrees
Center Line	17.0 meters - AGL	Azimuth	160.0 degrees
Elevation Angle	-5.0 degrees	Polarization	Horizontal and Vertical
Equipment Data			
FCC ID Number	SWX-M365	Lower/Center Frequency	3650.00000000 MHz
EIRP	42.0 dBm	Upper Frequency	3675.00000000 MHz
Emission Designator	17M8D7D	Modulation Scheme	BPSK, QPSK, QAM16, QAM64
Transmission Method/ Protocol Restricted or Unrestricted?	Restricted		
Transmission Method or Protocol Description	AirMax - Dynamic TDMA protocol implemented with a proprietary polling mechanism in which the BaseStation controls when each client transm		
Special Conditions	None		

Preliminary Identification of Provider's Coverage Area

Connected Nation extracted the MVQ information from the FCC ULS database in reference to Station WQPY563. The ULS data was utilized to create an RF propagation model using RF predictive software **(Exhibit E)**.

Exhibit E: MVQ Service Area Propagation Model – Estimated Coverage Area



Results and Submission for April 2013

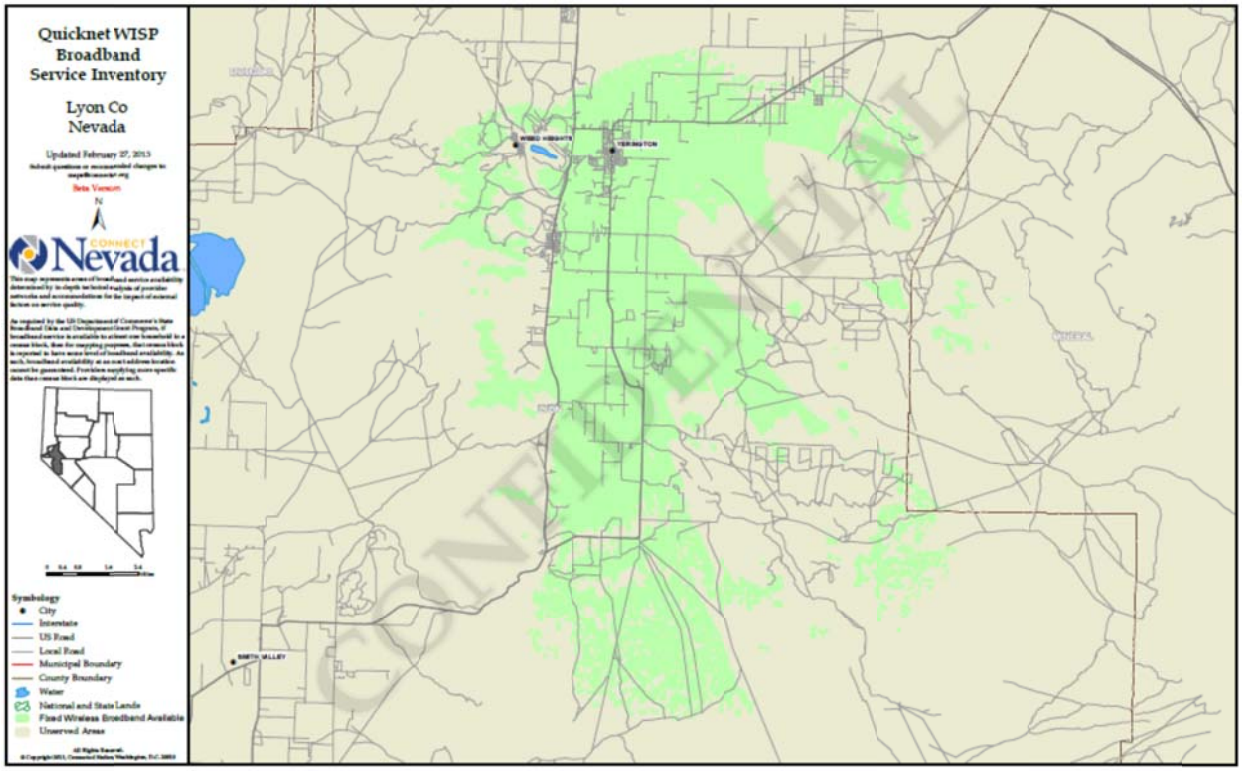
The ULS data and publicly available data were logged into the MVQ provider information spreadsheet **(Exhibit F)**. A composite propagation study was completed based on the data, and a PDF map was created for submission to the provider **(Exhibit G)**. This document was then forwarded to MVQ and the provider was advised that the information would be submitted to Connect Nevada and the NTIA broadband mapping project for processing if there is no input received from the provider within a 48-hour period regarding discrepancies of the estimated coverage.

Exhibit F: Mason Valley Quicknet Provider Information Spreadsheet

Wireless Provider Information	
Provider Name (Legal entity)	Mason Valley Quicknet LLC
DBA ("Doing Business As") Name	Quicknet
FRN # (10-digit FCC Registration Number) Providers needing to obtain an FRN should go to: https://fjallfoss.fcc.gov/coresWeb/publicHome.do	0018906461
Technology of Transmission Code	Terrestrial Fixed Wireless - Unlicensed
Also, please fill out the Subscriber Info. Tab	

Coordinates: Latitude - Degrees (e.g., 36° 24' 47.8" would be entered as: 36 in this column 24 in column L; and 47.8 in column M)	**Coordinates: Latitude - Minutes** (cannot be greater than 60)	**Coordinates: Latitude - Seconds** (cannot be greater than 60)	**Decimal Degree Conversion** (automatically converted here if you completed columns K, L and M)	**Coordinates: Longitude - Degrees** (e.g., 089° 08' 59.0" would be entered as 089 in this column 08 in column P; and 59.0 in column Q)	**Coordinates: Longitude - Minutes** (cannot be greater than 60)	**Coordinates: Longitude Seconds** (cannot be greater than 60)	**Decimal Degree Conversion** (automatically converted here if you completed columns O, P and Q)
36.0	**24.0**	**47.8**	***36.413278***	**89.0**	**8.0**	**59.0**	***-89.149722***
38.0	59.0	57.7	*38.999361*	119.0	11.0	12.0	*-89.149722*

Exhibit G: Mason Valley Quicknet Composite Coverage



SPRING CREEK WIRELESS

As part of its ongoing broadband mapping efforts, Connected Nation (CN) has developed a series of processes with the goal of submitting mapping data to NTIA for every known and qualifying last-mile broadband provider, regardless of whether the provider has chosen to support and participate in the State Broadband Initiative (SBI) mapping program.

The following narrative provides detail regarding the recent data collection activities related to Spring Creek Wireless (also d.b.a. Mighty Moose), a wireless Internet service provider (WISP), located in Spring Creek, Nevada, with a service area around Spring Creek. The narrative will include information regarding how and where CN obtained publicly available data and the on-the-ground due diligence, verification and validation techniques that support the underlying data.

Background

CN staff members have continued trying to obtain the participation of the provider with seven instances of communication via telephone and e-mail sessions since May 20, 2011, through July 16, 2012.[1] No communication was received from a company representative. This provider has no sales office.

The Issue

Spring Creek Wireless, by its lack of responsiveness since May 20, 2011, has predicated its unwillingness to participate in the Connect Nevada broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN began building a file based on research information and, as time progressed, enriched the file with information obtained through the public domain. For example, CN reviewed the provider's website (www.springcreekwireless.com) to determine the residential service plans **(Exhibit A)** of 1 Mbps downstream by 1 Mbps upstream and the service area **(Exhibit B)** of the provider's wireless network stated as "…the Spring Creek Housing Section"[2] and "…the Spring Creek Mobile Section."[3] A search for a Federal Registration Number (FRN) on the FCC **CO**mmission **RE**gistration **S**ystem (CORES) system yielded an FRN of 0017505199 **(Exhibit C)** with contact information relative to the owner of the company. Also, to support field validation of potential transmit sites and/or wireless access points, the FRN was referenced against the FCC Universal Licensing System (ULS) to identify any authorizations that the provider may hold for spectrum or leasing arrangements that could possibly enhance locating active wireless access points for the service area. This process yielded a 3650 MHz authorization for Station WQIQ571 **(Exhibit D)**, with zero unique locations.

[1] Including the recent distribution of the NPP estimated coverage area to the provider on March 7, 2013.
[2] Spring Creek website.
[3] Mighty Moose website.

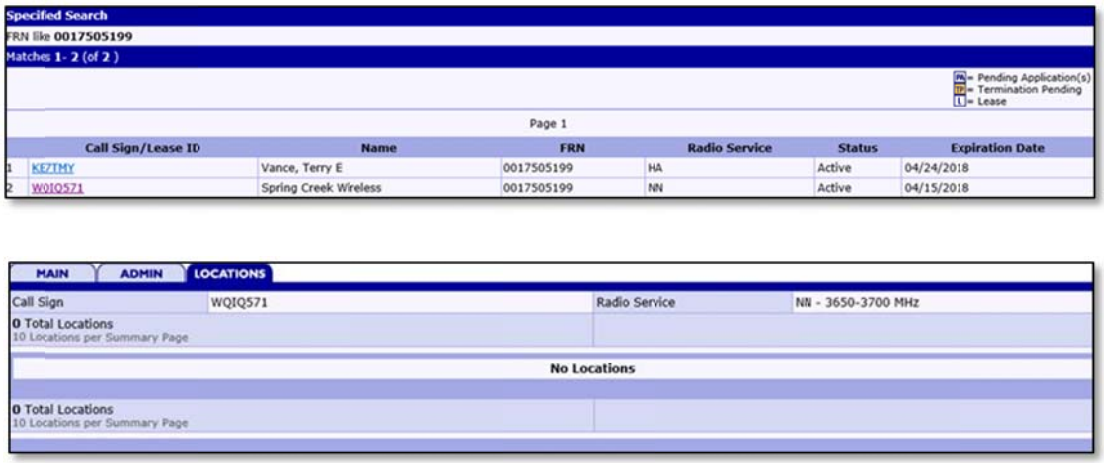
Exhibit A: Service Plans

Exhibit B: Defined Service Areas from Provider's Websites

Exhibit C: Federal Registration Number

Registration Detail	
FRN:	0017505199
Registration Date:	03/02/2008 12:21:00 PM
Last Updated:	
Business Name:	Spring Creek Wireless
Business Type:	Private Sector , Sole Proprietor
Contact Organization:	Spring Creek Wireless
Contact Position:	Owner
Contact Name:	Terry Vance
Contact Address:	PO Box 8352 Spring Creek, NV 89815 United States
Contact Email:	terry@springcreekwireless.com
ContactPhone:	(775) 777-9999
ContactFax:	

Exhibit D: WQIQ571 License Reference



Specified Search

FRN like **0017505199**

Matches **1 - 2** (of **2**)

PA = Pending Application(s)
TP = Termination Pending
L = Lease

Page 1

	Call Sign/Lease ID	Name	FRN	Radio Service	Status	Expiration Date
1	KE7TMY	Vance, Terry E	0017505199	HA	Active	04/24/2018
2	WQIQ571	Spring Creek Wireless	0017505199	NN	Active	04/15/2018

MAIN | ADMIN | LOCATIONS

Call Sign	WQIQ571	Radio Service	NN - 3650-3700 MHz

0 Total Locations
10 Locations per Summary Page

No Locations

0 Total Locations
10 Locations per Summary Page

<u>Preliminary Identification of Provider's Coverage Area</u>

Spring Creek Wireless does not provide a map of its service area on its website nor do they provide the location of a sales office. Connected Nation identified the Spring Creek Wireless service area using information from their website and other Internet based sources. Spring Creek Wireless claims to provide Internet access service in two discrete and easily identifiable areas of Spring Creek: the "Trailer Section" and the "Housing Section." This information was utilized to create Google Earth images of the service areas **(Exhibit E, Exhibit F)**.

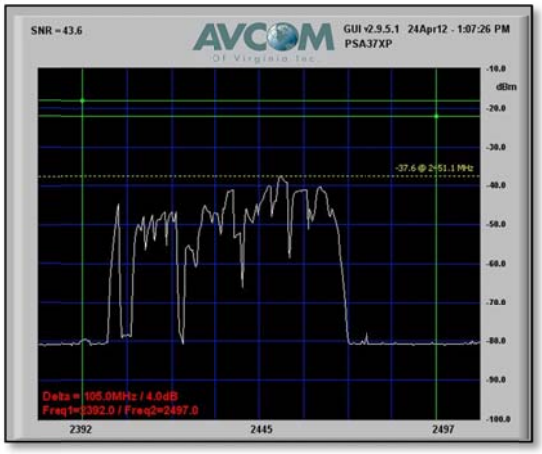
Exhibit E: Google Earth Spring Creek Trailer Section

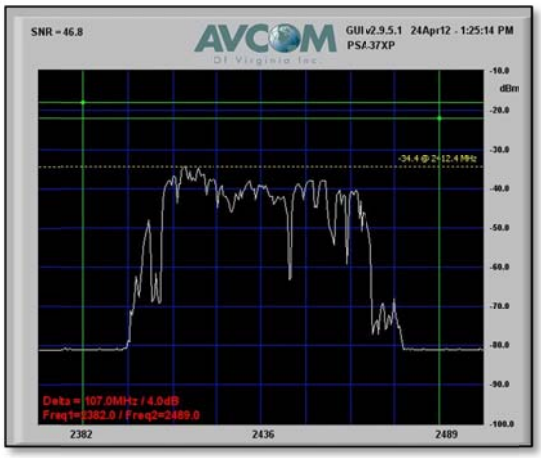
Exhibit F: Spring Creek Housing Section

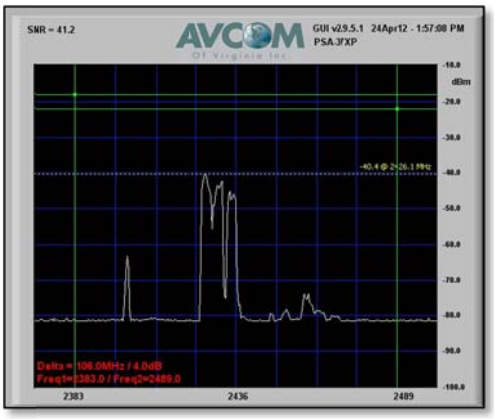
Testing Techniques

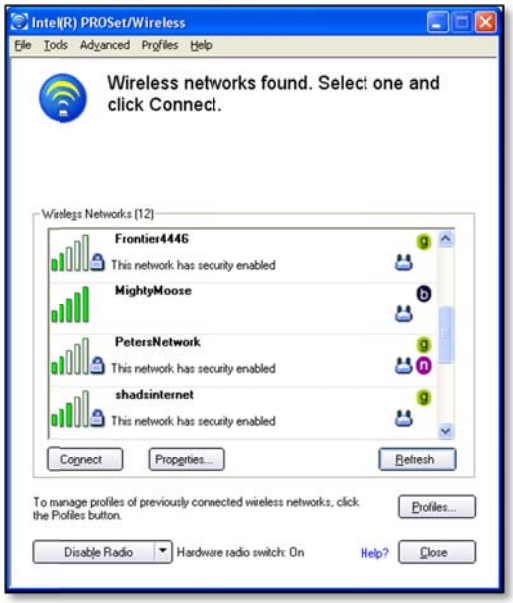
Connected Nation staff developed a site validation route based on data established from the Google Earth image. The CN wireless engineer was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands **(Exhibit G)**. Each validation point was scrutinized for specific frequency of operation. A screen image of the operating frequency (or frequencies) was captured; general notes were recorded for each location and photographs were taken of the transmit sites, wireless access points, or customer premise equipment that help triangulate tower site locations or that verified actual operation of service.

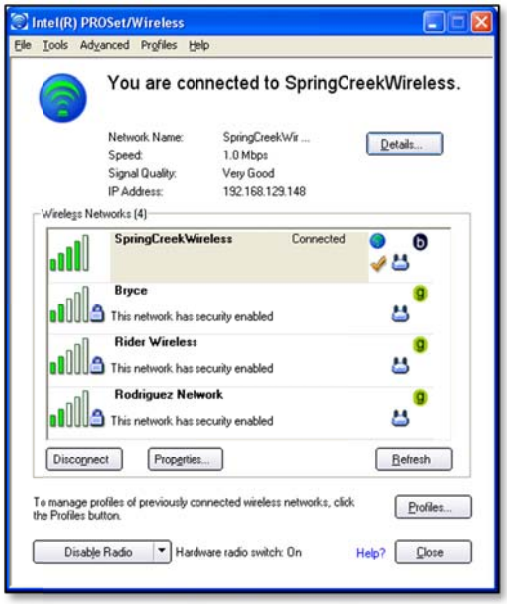
Exhibit G: Field Data for Spring Creek Wireless Hub Location






SNR = 41.2
AVCOM
GUI v2.9.5.1 24Apr12 - 1:57:08 PM
PSA.JFXP
dBm
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
-90.0
-100.0
-40.4 @ 2426.1 MHz
Delta = 106.0MHz / 4.0dB
Freq1=2383.0 / Freq2=2489.0
2383
2436
2489


Intel(R) PROSet/Wireless
File Tools Advanced Profiles Help
Wireless networks found. Select one and click Connect.
Wireless Networks (12)
Frontier4446
This network has security enabled
MightyMoose
PetersNetwork
This network has security enabled
shadsinternet
This network has security enabled
Connect
Properties...
Refresh
To manage profiles of previously connected wireless networks, click the Profiles button.
Profiles...
Disable Radio
Hardware radio switch: On
Help?
Close


Intel(R) PROSet/Wireless
File Tools Advanced Profiles Help
You are connected to SpringCreekWireless.
Network Name: SpringCreekWir ...
Speed: 1.0 Mbps
Signal Quality: Very Good
IP Address: 192.168.129.148
Details...
Wireless Networks (4)
SpringCreekWireless Connected
Bryce
This network has security enabled
Rider Wireless
This network has security enabled
Rodriguez Network
This network has security enabled
Disconnect
Properties...
Refresh
To manage profiles of previously connected wireless networks, click the Profiles button.
Profiles...
Disable Radio
Hardware radio switch: On
Help?
Close

Results and Submission for April 2013

Of the seven locations visited during the validation point route, two access points were identified and relative information was logged into the Spring Creek Wireless field validation notes file **(Exhibit H)**. The field and the publicly available data were transferred to the Connected Nation provider information file and a composite propagation study was completed based on the field data **(Exhibit I)**. Both documents were forwarded to Spring Creek Wireless and the provider was advised the information would be submitted to Connect Nevada and the NTIA broadband mapping project for processing if the provider did not report discrepancies of the estimated coverage 48-hour hours of receipt.

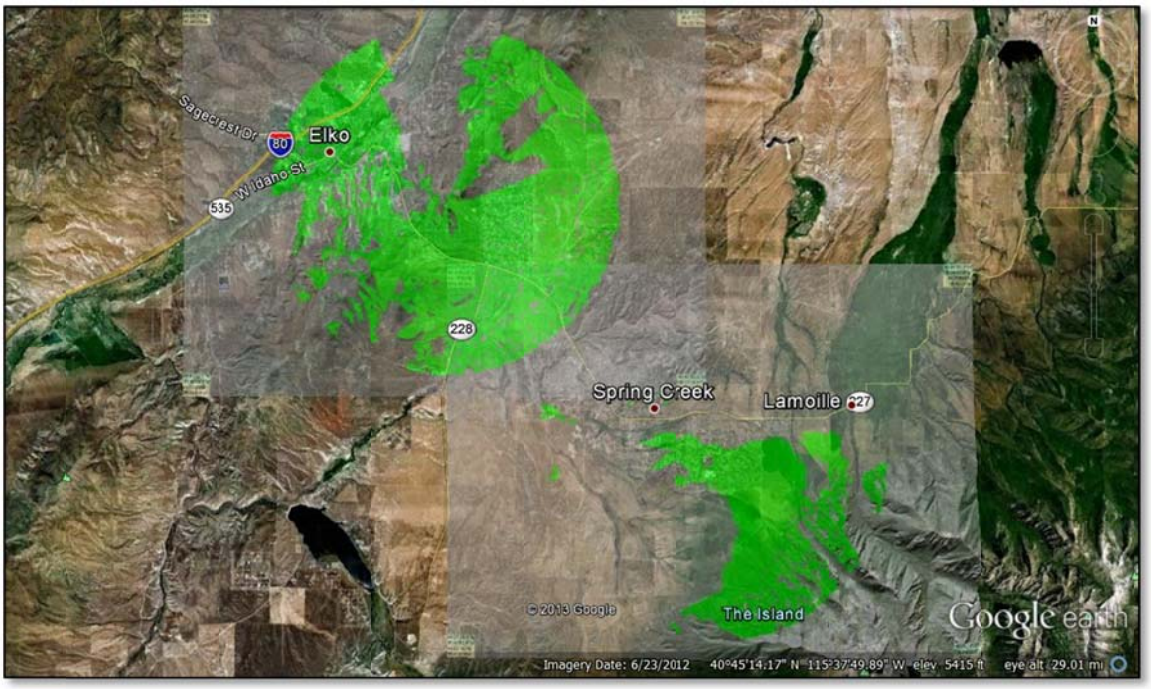
Exhibit H: Field Validation Notes

		Provider			Test Site Info				
Site #	Date	Provider	Provider Ref #	FRN Validation	Test City	Test State	Test County	Physical Address	Location Description
1	4/24/12	Spring Creek	5994	Yes	Spring Creek	NV	Elko	2340 Dove Creek Ct	Residence (CPE)
2	4/24/12	Spring Creek	5994	Yes	Spring Creek	NV	Elko	475 Edgewater Dr	Residence (CPE)
3	4/24/12	Spring Creek	5994	Yes	Spring Creek	NV	Elko	382 Brent Dr	Residence (CPE)
4	4/24/12	Spring Creek	5994	Yes	Spring Creek	NV	Elko	400 Brent Drive	Residence (CPE)
5	4/24/12	Spring Creek	5994	Yes	Spring Creek	NV	Elko	425 Brent Dr	Residence (CPE)
6	4/24/12	Spring Creek	5994	Yes	Spring Creek	NV	Elko	Lamoille Hwy	AP Antenna Site
7	4/24/12	Spring Creek	5994	Yes	Spring Creek	NV	Elko	711 Bronco Dr	Residence; Headend

Engineer	Coordinates NAD 83 REQUIRED							
Engineer	Lat Deg	Lat Min	Lat Sec	(-) Long Deg	Long Min	Long Sec	(N) Lat Decimal	(-)(W) Long Decimal
C. Roodenburg	40	47.318		-115	39.781		40.78863	-115.66302
C. Roodenburg	40	47.309		-115	40.175		40.78848	-115.66958
C. Roodenburg	40	47.663		-115	39.835		40.79438	-115.66392
C. Roodenburg	40	47.743		-115	39.863		40.79572	-115.66438
C. Roodenburg	40	47.861		-115	39.904		40.79768	-115.66507
C. Roodenburg	40	48.75		-115	42		40.81250	-115.70000
C. Roodenburg	40	42.274		-115	33.333		40.704567	-115.555550

Platform Type		Test Data		Visual Confirmation		Signal Verification/Spectrum Analyzer				
Type	Presence Confirmed	Type	Pass or Fail?	Type	Images	Peak Freq	Peak Sig Strength	Spectrum Analyzer	Time	Images
Fixed Wir	Yes	Visual	Pass	Customer	Yes	2451.1	-37.6	Avcom PS	1:07 PM	Yes
Fixed Wir	Yes	Visual	Pass	Customer	Yes	2412.4	-34.4	Avcom PS	1:25 PM	Yes
Fixed Wir	Yes	Visual	Pass	Customer	Yes	2426.1	-40.4	Avcom PS	1:57 PM	Yes
Fixed Wir	Yes	Visual	Pass	Customer	Yes					
Fixed Wir	Yes	Visual	Pass	Customer	Yes					
Fixed Wir	Yes	Visual	Pass	Wi-Fi/AP	Yes					
Fixed Wir	Yes	Signal Ver	Pass	Wi-Fi/AP	Yes	2450.9	-32.8	Avcom PS	3:37 PM	Yes

Exhibit I: Spring Creek Wireless Composite Coverage



APPENDIX B: BROADBAND PROVIDER LOG

Broadband Provider Log

Complete	81
Non-Responsive/Refused	0
In Progress	0
Reseller Providing Data	1
Count of Datasets by Status	**82**
Total Unique Providers Represented	**60**

Provider Name	Platform	Status	NDA Execution Date	Notes
Arizona Nevada Tower Corporation	Fixed Wireless	Data Added to Statewide Inventory	3/8/2010	[MAR-13-13 Jess Cary] Change: Provider expanded coverage area.
Arizona Nevada Tower Corporation	Fixed Wireless	Data Added to Statewide Inventory	3/8/2010	[MAR-13-13 Jess Cary] Change: Provider expanded coverage area.
AT&T Inc.	DSL	Data Added to Statewide Inventory	12/16/2009	[MAR-13-13 Jess Cary] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
AT&T Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/16/2009	[FEB-13-2013 Jess Cary] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
CenturyLink	DSL	Data Added to Statewide Inventory	12/4/2009	[MAR-13-13 Jess Cary] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Charter Communications, Inc.	Cable	Data Added to Statewide Inventory	12/15/2009	[MAR-13-13 Jess Cary] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Clearwire Corporation	Fixed Wireless	Data Added to Statewide Inventory	3/3/2010	[MAR-13-13 Jess Cary] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Clearwire Corporation	Mobile Wireless	Data Added to Statewide Inventory	3/3/2010	[MAR-13-13 Jess Cary] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Commnet Wireless, Inc.	Mobile Wireless	Data Added to Statewide Inventory		[MAR-13-13 Jess Cary] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
CoxCom, Inc.	Cable	Data Added to Statewide Inventory	2/3/2010	[MAR-13-13 Jess Cary] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Filer Mutual Telephone Company	DSL	Data Added to Statewide Inventory	2/9/2010	[MAR-13-13 Jess Cary] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Fort Mojave Telecommunications, Inc.	Fiber	Data Added to Statewide Inventory		[MAR-13-13 Jess Cary] Change: Provider expanded coverage area.
Frontier Communications Corporation	DSL	Data Added to Statewide Inventory	1/22/2010	[MAR-13-13 Jess Cary] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Hot Spot Broadband, Inc.	Fixed Wireless	Data Added to Statewide Inventory		[MAR-13-2013 Jess Cary] Correction: Provider no longer offers speed tier 10 download. Max download speed is now speed tier 7.
Leap Wireless International, Inc.	Mobile Wireless	Data Added to Statewide Inventory	4/6/2010	[FEB-14-2013 Jess Cary] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
MegaPath Corporation	DSL	Data Added to Statewide Inventory	2/15/2010	[MAR-13-13 Jess Cary] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Moapa Valley Telephone	DSL	Data Added to Statewide Inventory	2/22/2010	[MAR-13-13 Jess Cary] Change: Provider expanded coverage area.
Robinson Communications Corporation	DSL	Data Added to Statewide Inventory	2/25/2010	[MAR-13-2013 Jess Cary] Change and Correction: Provider submitted new DSLAM locations; coverage was also modified from buffers around DSLAM to network analyst coverage.
Skycasters	Satellite	Data Added to Statewide Inventory	10/16/2012	[MAR-13-2013 Jess Cary] Correction: Provider added satellite coverage but previously in operation.

Sprint Nextel Corporation	Mobile Wireless	Data Added to Statewide Inventory	1/14/2010	[FEB-13-Jess Cary] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
T-Mobile USA, Inc.	Mobile Wireless	Data Added to Statewide Inventory	1/8/2010	[FEB-13-2013 Jess Cary] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Verizon Communications, Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/14/2009	[FEB-13-2013 Jess Cary] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
WENR Corporation	Cable	Data Added to Statewide Inventory	1/11/2010	[FEB-12-13 Jess Cary] Change: Provider expanded coverage area.
Wireless Beehive, LLC	Fixed Wireless	Data Added to Statewide Inventory	4/5/2010	[MAR-13-13 Jess Cary] Change: Provider upgraded infrastructure and can now offer tier 8 download speeds and tier 7 upload speeds.
Wireless Beehive, LLC	Fiber	Data Added to Statewide Inventory	4/5/2010	[MAR-13-2013 Jess Cary] Change: Provider added initial fiber coverage
WUE Inc.	Mobile Wireless	Data Added to Statewide Inventory	3/5/2010	[MAR-13-2013 Jess Cary] Change: Provider's speeds now meet the threshold for broadband.
CoxCom, Inc.	Backhaul	Backhaul Provider Only Processing Complete	2/3/2010	
Level 3 Communications, Inc.	Backhaul	Backhaul Provider Only Processing Complete	12/14/2009	
MegaPath Corporation	Backhaul	Backhaul Provider Only Processing Complete	2/15/2010	
Sprint Nextel Corporation	Backhaul	Backhaul Provider Only Processing Complete	1/14/2010	
T-Mobile USA, Inc.	Backhaul	Backhaul Provider Only Processing Complete	1/8/2010	
Hughes Network Systems, LLC	Satellite	Speed Only Update; Data Processing Complete	2/5/2010	[MAR-13-2013 Jess Cary] Change: Provider upgraded infrastructure and can now offer tier 7 download speeds and tier 4 upload speeds.
Lincoln Communications, Inc.	DSL	Speed Only Update; Data Processing Complete	3/5/2010	[MAR-13-13 Jess Cary] Correction: Coverage area remained the same, but upload speed tier decreased to 4.
Lincoln Communications, Inc.	Fiber	Speed Only Update; Data Processing Complete	3/5/2010	[MAR-13-13 Jess Cary] Correction: Coverage area remained the same, but provider now offers speed tier 8 download.
Avant Wireless LLC	Fixed Wireless	No Update-Estimated Coverage Submitted for Non-Participating Provider		
Mason Valley Quicknet, LLC	Fixed Wireless	Estimated Coverage Submitted for Non-Participating Provider		[MAR-15-13 Jess Cary] Correction: Coverage not submitted in previous datasets; coverage created from specs obtained from FCC ULS registration site.
Spring Creek Wireless	Fixed Wireless	Estimated Coverage Submitted for Non-Participating Provider		[MAR-15-13 Jess Cary] Correction: Coverage not submitted in previous datasets; coverage created from on-site observations.
Highlands Wireless Inc.	Fixed Wireless	Approval for Update Not Received – Data Still Submitted		[MAR-15-2013 Jess Cary] Change: Provider added new towers and now has a max download speed tier of 7.
Above All Communications, LLC	DSL	No Update to Provide		Reseller providing data.
Above All Communications, LLC	Fixed Wireless	No Update to Provide		
Absolute Best Communications, LLC	Fixed Wireless	No Update to Provide		
Air-Internet, Inc.	Fixed Wireless	No Update to Provide		
Arizona Nevada Tower Corporation	Backhaul	No Update to Provide	3/8/2010	
Baja Broadband Holding Company, LLC	Cable	No Update to Provide	2/22/2010	
CalNeva Broadband, LLC	Cable	No Update to Provide	4/8/2010	
CenturyLink	Backhaul	No Update to Provide	12/4/2009	
CenturyLink	Backhaul	No Update to Provide	12/4/2009	
Charter Communications, Inc.	Backhaul	No Update to Provide	12/15/2009	
Churchill County Telephone	DSL	No Update to Provide	6/11/2010	
Churchill County Telephone	Fiber	No Update to Provide	6/11/2010	
ETAN Industries	Cable	No Update to Provide		
Ezznet, Inc.	Fixed Wireless	No Update to Provide		
Fort Mojave Telecommunications, Inc.	DSL	No Update to Provide		
Frontier Communications Corporation	Backhaul	No Update to Provide	1/22/2010	
Great Basin Internet Services, Inc.	Fixed Wireless	No Update to Provide	4/6/2010	
High Desert Internet Services	Fixed Wireless	No Update to Provide		
InfoWest, Inc.	Fixed Wireless	No Update to Provide		
Jab Wireless, Inc.	Fixed Wireless	No Update to Provide	6/14/2010	
LasVegas.Net LLC	Fixed Wireless	No Update to Provide		
Martell Telecommunications	DSL	No Update to Provide	3/23/2010	
MetroPCS Wireless, Inc.	Mobile Wireless	No Update to Provide	2/10/2012	
Moapa Valley Telephone	Fiber	No Update to Provide	2/22/2010	
Mt. Wheeler Power	DSL	No Update to Provide	4/5/2010	
Mt. Wheeler Power	Fixed Wireless	No Update to Provide	4/5/2010	
Oasis Online, Inc.	Fixed Wireless	No Update to Provide		
Rio Virgin Telephone Company	DSL	No Update to Provide		
Schatnet Internet LLC	Fixed Wireless	No Update to Provide		
SMS Computing, Inc.	Fixed Wireless	No Update to Provide	3/19/2010	
Spacenet, Inc.	Satellite	No Update to Provide		
Tele-NET.net LLC	Fixed Wireless	No Update to Provide		
tw telecom of nevada, llc	Backhaul	No Update to Provide	4/27/2010	
Vegas Wifi Communications LLC	Fixed Wireless	No Update to Provide	4/7/2010	
Verizon Communications, Inc.	Backhaul	No Update to Provide	12/14/2009	
ViaSat, Inc.	Satellite	No Update to Provide	1/8/2010	
WaveDirect Telecommunications, LLC	Fixed Wireless	No Update to Provide		

Wireless Beehive, LLC	DSL	No Update to Provide	4/5/2010	
XO Communications, LLC	Backhaul	No Update to Provide	6/2/2010	
Yonder Media	Fixed Wireless	No Update to Provide		
Cogent Communications, Inc.	Backhaul	No Update Provided – Use Last Submission Data		
Nevada System of Higher Education	Backhaul	No Update Provided – Use Last Submission Data		
Rio Virgin Telephone Company	Fiber	No Update Provided – Use Last Submission Data		
Zayo Bandwidth, LLC	Backhaul	No Update Provided – Use Last Submission Data		

New York Methodology Paper for Round 7 (December 2012) Data Submission to the NTIA under the SBI

April 1, 2013

Executive Summary

The Broadband Mapping Team at the New York State Office of Cyber Security (OCS) is pleased to submit our Round 7 (December 2012) data for the State Broadband Initiative (SBI).

Our goals for Round 7 were to (1) maintain the very high level of participation from our current participating providers; (2) improve our maximum advertised speed data and CAI data; and (3) improve the completeness and quality of the data delivered to the NTIA. We believe we have met those goals.

We had 86 providers participate in the June 2012, Round 6 submission. That number has stayed the same in Round 7. We still have hopes of adding new fixed wireless participants in future rounds. We now have a relationship with the national WISPA organization which is encouraging their members to participate in their state's SBI mapping program. Together with Rick Harnish, WISPA Executive Director, we are currently planning a one day WISP conference in Albany to enhance awareness of both our program and WISPA.

For the second collection period in a row we achieved a significant increase in the quality of new and updated maximum advertised speed data received and we realized the largest incremental increase in the amount of broadband service attributes collected from Community Anchor Institutions. These data improvements were both instrumental in our support of our $25 million Connect NY grant program aimed at funding strategic infrastructure build out.

We have continued to refine our workflow to improve efficiency and reduce errors, and in Round 7 this allowed us to compile our geodatabase sooner and devote more time to QA/QC than in past rounds. Communication with other states through PBWorks and the interactive webcast provided us with valuable information that solved a technical problem we were having with our delivery geodatabase.

The remainder of this paper provides a summary of our data collection results and describes our methodology for performing data verification.

Provider Participation Summary Tables for Round 7:

0	**Potential Providers identified**
0	**Actual Providers identified**
86	**Total Participating Providers with data in the submission**
67	Wireline Providers
20	Wireless Providers (2 are both Wireless & Wireline)
1	Provider is middle-mile only
42	Providers submitted Middle Mile Data

Technology Type	Wireline Census Block Provider Count	Wireline Service Availability by Census Block	Wireline Street Segment Provider Count	Wireline Service Availability by Street Segment	Wireless Provider Count	Wireless Services by Shapefile	Middle Mile Provider Count	Middle Mile Points
Asymetric xDSL	38	298,839	34	25,243	0	0	26	1,503
Symetric xDSL	2	55,381	1	52	0	0	0	0
Other Copper Wireline	2	87,666	2	251	0	0	0	0
Cable Modem - DOCSIS 3.0	6	281,761*	5	27,718*	0	0	3	10
Cable Modem - Other	11	3,946*	10	1,326*	0	0	1	1
Optical Carrier/Fiber to the End User	25	133,488	18	2,613	0	0	8	707
Satellite	0	0	0	0	4	5	0	0
Terrestrial Fixed Wireless - Unlicensed	0	0	0	0	10	18	1	12
Terrestrial Fixed Wireless - Licensed	0	0	0	0	1	1	0	0
Terrestrial Mobile Wireless	0	0	0	0	6	17	2	15
Other (middle-mile only)	0	0	0	0	0	0	1	2

* Time Warner Cable switched all availability to Cable Modem- DOCSIS 3.0 this round resulting in a dramatic decrease in the number of Cable Modem- Other records and an increase in DOCSIS 3.0 records.

Verification List:

1. Automated verification
    a. Domain and topology rules in delivery geodatabase
    b. Submission scripts
    c. Feature dataset cross checks
2. Provider website research
3. Virtual Field Inspections (using Google Streetview)
4. Crowd-sourced data
    a. NYS Speed Test data points
    b. FCC Speed Test records
    c. NYS Broadband Map feedback
5. Use of government data sources
    a. NY_June2012_Assessment.gdb
    b. FCC Aggregated 477 Data (*please see note in corresponding narrative below*)
    c. NYS DMV data
    d. NYS Lottery terminal data
    e. NYS Streets and Address ranges
    f. NYS Orthoimagery
    g. NYS Police Automatic Vehicle Location (AVL) Data

6. Commercial data sources
    a. TomTom ILEC, CLEC and Rate Center Exchange Boundary data
    b. Online look up tools for middle mile & central office locations
    c. NAVTEQ address points
    d. Pictometry oblique aerial imagery/Google's Street View
    e. APNIC Whois database (publically available IP Address search engine)

7. Select Community Anchor Institution (CAI) locations
8. Provider verification maps
9. Clip wireless data to NTIA recommended NYS Boundary and eliminated "cutouts"
10. Removal of 'uninhabited areas'
11. Other Grantee Methodology Papers

Explanation of Verification Activities:

1. **Automated verification** was accomplished via the following methods:
    a. Domain and topology rules in delivery geodatabase automatically validate features and validate topology
    b. Submission Scripts: Repeatedly running the NTIA supplied Python script, the Massachusetts modified Python submission script and frequency statistics script, as well as a New York modified version of the NTIA submission script combining elements of the NTIA and Massachusetts scripts
    c. Feature dataset cross-checks: ESRI 'Frequency' tool used on Provider Name, DBA Name, FRN across feature datasets with cross comparisons to ensure consistency across all of these datasets

2. **Provider Website Research**: The team continues to use the providers' websites to verify provider data submitted for the SBI mapping program. Data most frequently checked are maximum advertised speeds and whether the service offering is business or residential. That later classification is important to NY because our mapping team differentiates business only service on our state map and our Broadband Program Office has recently used that distinction in developing criteria for a capacity building grant.

3. **Virtual Field Inspections (using Google Street View)**
In June of 2012, two members of the Broadband Mapping Team were trained by members of our Public Utilities Commission staff on how to identify cable and fiber lines amongst the telephone and power lines on utility poles. There are certain distinctive wiring patterns and equipment boxes that identify where cable or fiber is present. After viewing representative schematics and photographs, the trainees spent time identify equipment and cables with Google Street View. Afterwards, the PUC staff took the trainees into the field to field verify the same equipment. This knowledge and technique are now used to investigate areas where a provider's presence on a road was called into question via one of our other verification methods. This is a time intensive verification method but has been found to be very effective in situations where field verification was deemed to be the only other way to investigate a discrepancy.

4. **Crowd-sourced data**
    a. **NYS Speed Test data points** and attributes were used to verify provider reported availability. The NYS speed test website includes a data collection form which requests:
        i. Street address at which the test was taken

ii. Service provider
iii. Service technology

After satellite provider records and sub-broadband speed records were removed, 7,218 records were successfully geocoded and used for verification. Four levels of verification were established for points that fell within areas of reported service availability. They are:

Code 1 = Provider and technology matched
Code 2 = Provider matched and technology unknown
Code 3 = Provider matched but technology is mismatched
Code 5 = Provider and technology unknown but Broadband is available at the location

Each census block and street segment availability record involved with this verification activity was assigned one of the above codes.

b. **FCC speed test records** were used to verify provider reported availability. FCC speed test records lack provider information but we were able to successfully establish the provider via a publically available IP Address search engine (the APNIC Whois Database). Those records were then used to verify provider reported availability in the same manner as was used with the NYS speed test points. Because the technology was not known, the highest verification code assigned was 2 (Provider Matched and Technology = 'Unknown'). Here is a statistical summary.

	Number	Percentage
Total Number of FCC Wireline Speed Test Points	74,984	N/A
Total Number / Percentage Successfully Geo-coded	44,957/74,984	60%
Total Number / Percentage Successfully IP Searched	31,473/44,957	70%

c. **NYS Broadband Map feedback:** Our state broadband map website is replete with opportunities for the general public to provide feedback. There are "unserved" reporting tools that differentiate between wireline and wireless. The public can see their location show up on our map in the form of a color-coded dot in the Public Feedback layer. Also, there is an *Is this Correct?* application, where users can comment on each of the providers that our map identifies as serving their location. These comments and complaints arrive in a separate public notification mailbox. We have a team member in charge of monitoring this inbox and crafting a personal response to each. Despite these noble efforts towards "ground truthing", changes to some provider's websites have reduced the opportunities for us to use this feedback to improve our map.

Previously, we had used the "availability checkers" on the larger provider websites to enter the unserved address to corroborate that indeed they do not serve it. We then checked a diverse sampling of other known addresses in that block or street segment, and if no service was available, we would remove the suspect block as being served by the provider. In the past year, Verizon has made it nearly impossible to run a string of these searches by blocking IP addresses that use their application frequently. This occurred during Round 6, and during Round 7, there was an edict added to their website stating that use of their application is for potential customers only. This left Time Warner Cable as the only major provider whose address inventory we could easily search. However, several months ago their availability checker changed. There no longer is an obvious place on the site where a user can just keep typing in a string of addresses to check availability. Instead, you have to click a ready to order

button, then pretend to begin setting up service before you have the option of typing an address. More problematic is the fact that TWC now seems to indicate serving any address they may someday consider serving, not just places where their service is already available. Many public e-mails exhibiting frustration have arrived in our mailbox confirming this. The feedback claims the TWC site says they have various broadband options, but when they call them, they say no, they send them a contradictory letter, or they may come out to the residence and offer a multi-thousand dollar hook-up fee option. In one case, a potential customer bought his house after checking to TWC's website to make sure high speed internet was available there. The website indicated it was available, but after he moved in the house and tried to order it, Time Warner told him that existing service was over 2 miles away and there would be a $62,000 hook-up fee to obtain their service at his residence!

In addition to feedback on the large providers, we also receive feedback for the smaller to mid-tier cable and DSL companies. Since they do not have sophisticated websites with availability checkers to corroborate the public assertions, it has been our policy that we cannot remove any census blocks for those providers, despite valid suspicions on our part backed by crowdsourcing feedback. An example of this is with Mid-Hudson Cablevision, where their service territory footprint is clearly disputed by the unserved wireline reports that can be viewed on our map.

Given these setbacks, in person field checking may be our only option for validating public feedback that contradicts provider supplied information. We will still use tools such as Google Street View on a limited basis to check plant data to help clear up conflicting information, but we will be investigating new methods to more consistently leverage data collected from our public feedback tools to whittle away at provider-centric data. Though there may be some exaggerated comments and biased data we will need to filter out, we will have to further entrust the populace with helping us if we want to do an even better job at mapping broadband reality.

5. **Use of government data sources:**

   a. **NY_June2012_Assessment:** The NTIA Assessment Database from Round 6 can be used to verify provider reported availability, technology type, max advertised download and max advertised upload speeds in Census 2010 blocks. In Round 7, data received from providers were tested against this assessment geodatabase to determine if blocks and streets not included in the current submission from the provider should be removed or left in the current submission to the NTIA. Based on the nature of some of the data submissions, the assessment data was also used to identify blocks that are candidates for removal. However, since companies report also on where they could provide data within the 7 to 10 day window, we realize that verification will not be exact. Any provider whose submission remains unchanged and who have blocks or street segments with low scores will be asked to verify that those blocks are correct. **Note: An earlier delivery of the assessment database for Round 7 would be very helpful so that verification could allow more interaction with providers prior to submission for Round 8 rather than being an "after the fact" adjustment.**

   b. **Aggregated FCC 477 data** were used in Round 5 to identify providers by tract, speeds above and below 3 mbps, and business vs. residential offerings. In Rounds 6 and 7 we used this previous data as a benchmark to review new data received. We will update our findings when new A477 data is made available to grantees.

   c. The **NYS Department of Motor Vehicles** supplied three datasets for our independent verification activities. A list of 2,080 unique Satellite Offices, Dealer Locations and Inspection Station Locations were used to verify provider reported availability*. All of these facilities have broadband connections.* The Dealer and Inspection Location datasets did not have provider or technology information associated with the locations. Therefore, the highest verification code assigned to any Census Blocks containing the points and Street Segments within 500 feet of the points was a 5 because we were only able to confirm that there was broadband at those locations. However, the DMV Satellite Offices dataset came with provider information, so any Census

Blocks containing the points and Street Segments within 500 feet of the points that matched the provider name were assigned a verification code of 2.

d. **The NYS Lottery** supplied a dataset to add to our independent verification sources. The majority of the Lottery data we received did not have provider or technology information associated with it, so it could not be determined if many of the sites *actually* had access to a broadband connection. However, there were 276 Lottery terminal locations that had provider information associated with them. These locations were *confirmed* to have broadband connections and therefore any Census Blocks containing the points and Street Segments within 500 feet of the points that matched the provider name were given a verification code of 2.

e. **NYS Streets and Address Ranges** is a dataset we use to submit all of our provider data in census blocks > $2mi^2$. They are also used as part of our geocoding. Street address ranges are also used in verification of provider data by testing addresses along segments with online provider service look-up tools ("availability checkers").

f. **NYS Orthoimagery** was used as an aid during provider data processing.

g. **NYS Police Automatic Vehicle Location Data** was obtained as a potential verification source for Verizon Wireless' coverage area. Basically, the data are records of communication between an air card in a police cruiser and a Verizon Wireless server. In order to evaluate its usefulness, the State Police IT unit provided a week's worth of data (over 4 million records!). For security and privacy reasons, all of the attributes were stripped except for a combined date/time field (which contained date/hours/minutes/seconds/Eastern Daylight), Longitude and Latitude fields. The data were given to us in .dbf format, which was used to create points based on the latitude and longitude values. The AVL data points were then overlaid onto the Verizon Wireless data from Round 6. We expected to be able to pick out areas that were reported as covered by Verizon Wireless that may have had poor or no coverage based on points (or lack thereof) in the NYSP AVL data. The comparison did not prove to be as useful as we had hoped as the AVL data did not always correspond well with the Verizon Wireless coverage area. It was difficult to tell in many areas if the Verizon Wireless coverage was spotty or if the road was just sparsely travelled by NYSP vehicles. On roads that were travelled heavily by the NYSP, it was difficult to tell which point corresponded to a specific vehicle since all of the vehicle identification information had been removed. The only way to tell was by looking at the combined date/time field and seeing which points along the same road were a few minutes apart as opposed to several hours apart. We also discovered that there were areas where Verizon Wireless does not claim to have service but the AVL data points tracked right through them like there was full coverage. We thought this could potentially be caused because the NYSP air cards use SMS to send location information. SMS can be successfully transmitted in areas where the cellular service is too weak to successfully make a voice call or use the internet. Since we were not able to distinguish between NYSP vehicles and the fact that there were points in areas that Verizon did not claim to cover, we were not confident that this data could be used a make changes to data provided by Verizon Wireless. We do not plan to repeat this process again.

6. **Commercial data sources:**
   a) **TomTom ILEC, CLEC and Rate Center Exchange Boundary data** were used to verify provider reported availability. The TomTom data included boundaries for many of the broadband providers we have received data from. During data processing, TomTom boundaries for each provider included in the dataset were overlaid onto the provider blocks and street segments footprint to ensure that the availability data sent to us by the providers fell reasonably within the respective boundary in the commercially available TomTom

data. All of the provider footprints that had matching boundaries in the TomTom data fell within their respective boundary. In one case, Verizon New York, the ILEC boundary was used to remove outlier data. Discontinuous blocks and streets submitted that fell more than one mile outside Verizon's ILEC boundary was removed. The TomTom Exchange Boundary data was used to further improve broadband availability and middle mile data for Frontier Communications. Their DSLAM data is CLLI-coded which are tied to specific exchanges. By using the exchange boundary dataset we were able to improve the accuracy of many of Frontier's DLSAM and Central Office locations, and thereby improve the blocks and streets broadband data for Frontier overall.

b) **Online look up tools for middle mile & central office locations:** Additional publicly available CLLI code location lookups were used to supplement the refinement of Frontier's DSLAM locations: *Marigold Technologies* Central Office Lookup Tool (http://www.marigoldtech.com/lists/co.php) and *TelcoData.us* (http://www.telcodata.us/) online search tools. Further research into these or other publicly available datasets may help us add to, refine, and verify our middle mile and broadband availability data for all of our facilities-based broadband providers.

c) **NAVTEQ Address Points** were also used as an aid during provider data processing, for geocoding address data, and also in the verification of provider data by testing addresses with online provider service look-up tools

d) **Pictometry oblique aerial imagery/Google's Street View**: In the process of improving the CAI point location accuracy, we are using the CAI's website, Bing's Bird View (Pictometry Oblique Aerial Imagery) and Google's Street View function to provide us information to accurately put the points on the rooftop of the building. The CAI website can provide information about name, address, and exterior pictures of the CAI. With this information, we can use Google's Street View to identify the exact location of the building, either by matching the pictures or looking at signs. If Google's Street View failed to provide enough clues to be certain, we will use the Bing's Bird View to identify the exterior look of the building and try to match that with the pictures from the homepage. Additionally, we can look for adjoining clues such as a playground around the building if we are looking to improve a school CAI point.

e) **APNIC Whois database,** as mentioned above, was used add provider information to FCC speed test records.

7. **Select CAI locations** were used to verify provider reported availability. Through our continuing relationship with the University at Albany's Center for Technology in Government (CTG), we acquired 1,459 new, complete broadband service details for CAI records during the Round 7 data gathering process. This brings CTG's total number of CAI records attributed with broadband information to 3,940. Each of these records was used to verify the provider reported data. Where the information matched, the highest verification code was assigned (1 = Provider and technology matched). We also selected Colleges, Hospitals, Federal Correctional Facilities, State Prisons and State Police Stations from our total collection of previously identified CAIs to be used as an additional verification data source. As previously stated, while we do not have complete service details for some of these facilities, we strongly believe all have broadband connections and therefore are a good supplemental verification data source. CTG is currently focusing their outreach on institutions within the Medical/Heathcare and Other Community Support - Government CAI categories. Many of these institutions records will be available for verification for Round 8 data.

8. **Provider verification maps:** For providers with significant changes from the previous round, we created review maps showing Round 6 availability aggregated to census blocks and street segments. The providers were given at least five days to respond and initiate any changes or corrections. Changes were made based on provider feedback. Changes were documented for future reference.

9. **Clipping all wireless data to the** NTIA recommended **NYS boundary file** to help ensure topological compliance for all wireless availability to be wholly within New York State.

10. **Removal of 'uninhabited areas':** These areas have been classified as land where development cannot occur, and where household wireline broadband will not be needed at any foreseeable time. If the center of a census block with no population or housing units falls within an uninhabitable area, the entire census block ≤ $2mi^2$ or all street segments within an identified block > $2mi^2$ are classified as uninhabited. We remove uninhabited blocks and streets from the provider submission data. The classifications of uninhabited lands include, but are not limited to: water, wilderness lands, reforestation areas, as well as portions of state parks, federal nuclear sites, and recreation areas.

11. **Other Grantee Methodology Papers** from previous round(s) were researched to identify potential mergers & acquisitions of national providers serving in New York, and to obtain ideas for future verification measures.

New York Methodology Outreach List:

As directed by the SBI Program Office in the March 26, 2012 delivery webinar, New York has included only providers who submitted data, or those who have been identified as true potential providers, in our Round 7 Data Package.xls.

The following "outreach list" is a summary of providers not included in Data Package.xls. This list represents the volume of companies that New York has researched, contacted and, in some cases, received data from in previous and current data cycles. The list includes:

- Companies found to be "not a provider"
- Providers who do not serve New York
- Broadband equipment companies
- Providers who chose to opt-out of the program
- Resellers

Providers are identified by DBA name, provider type, and status. Comments are included for additional details.

Filing Company DBA	Provider Type: Broadband=1 Reseller=2 Other=3 N/A=4	Provided Data, Will provide data, Will Not provide data, Non-Responsive	Comments
2nd Century Communication	4	Will Not Provide Data	Purchased by Covad
3M Telecom Systems Division	4	Will Not Provide Data	Supplier of equipment to broadband providers
8x8, Inc.	4	Will Not Provide Data	Voice only.
A.R.C. Networks, Inc	4	Will Not Provide Data	Cannot identify this company or what they provide
ABA Net, LLC	4	Will Not Provide Data	Voice services
ACC Business	2	Will Not Provide Data	Emailed to indicate they cannot participate
ACC National Telecom	4	Will Not Provide Data	Voice/data infrastructure company
Access One, Inc.	2	Will Not Provide Data	Business only reseller.
Access Point, Inc.	2	Will Not Provide Data	Reseller.

Accessline Communications Corporation	4	Will Not Provide Data	Voice only.
ACCESSLINE COMMUNICATIONS CORPORATION	4	Will Not Provide Data	voice/telephoney services
Ace Innovative Networks	2	Will Not Provide Data	Have contacted previously but reseller status was low priority for R5.
Ace Innovative Networks, Inc.	2	Will Not Provide Data	Reseller of Verizon.
Acella, Inc.	4	Will Not Provide Data	Voice only.
ACN Communications	4	Will Not Provide Data	Reseller "requires a pre-existing connection"
ACN Digital Phone	4	Will Not Provide Data	Voice/phone only.
Adelphia Cable	1	Will Not Provide Data	Does not provide services to NYS customers
Aeroblaze Broadband	4	Will Not Provide Data	Website listed will not open, no Google results.
Airband	4	Will Not Provide Data	Does not operate or have a market in New York
Airespring, Inc.	2	Will Not Provide Data	"Airespring, Inc. is a reseller of underlying carriers Only."
Allegiance Telecom, Inc.	4	Non-Responsive	Purchased by Qwest; no answer through two phone lines
Alliance Group Services, Inc.	3	Will Not Provide Data	Quote: Connects CLECs and ILECs to global network
AlreadyNet	3	Non-Responsive	Discovered in R5. Not a Provider
American Fiber Network, Inc. (AFN)	3	Will Not Provide Data	Company solely provides EVDO wireless cards
American Fiber Systems, Inc.	3	Will Not Provide Data	Sold to Zayo
American Telephone Co. LLC	4	Will Not Provide Data	"Not a provider" on Form C.
American Tower	3	Will Not Provide Data	Wireless tower company/infrastructure
Amextel	4	Will Not Provide Data	Voice services
AMp Networks LLC	4	Will Not Provide Data	Very unclear what they provide.
ANPI	3	Will Not Provide Data	Infrastructure/backbone- not end user.
Apptix, Inc.	4	Will Not Provide Data	Voice only.
Aptela, Inc.	4	Will Not Provide Data	Voice only.
Atlantech Online, Inc.	2	Will Not Provide Data	Reseller, few NY customers, not willing to participate.
Atlantic Telecommunications Services Corp.	4	Will Not Provide Data	Company provides cable services related to the NYS legislature (6/29/10 phone)
Backbone Communications Inc.	2	Non-Responsive	Reseller to businesses only; concentrated in NYC.
Bandwidth.com	2	Will Not Provide Data	CLEC. Buys services in bulk & resells portions to various customers
BCN Telecom Inc	4	Will Not Provide Data	Voice services
Bell Canada	4	Will Not Provide Data	Does not provide services to NYS customers
Bellsouth	4	Will Not Provide Data	Bellsouth serves 9 southern states; is related to AT&T.
Belmont Telecom	4	Will Not Provide Data	VoIP Wholesale, Long Distance, Roaming.
BestWeb Corp.	2	Will Not Provide Data	Not interested in participating.
BetterWorld Telecom LLC	3	Will Not Provide Data	Outside of NY state.
Birch Communications, Inc.	3	Will Not Provide Data	Outside of NY state.
Blue Wireless	1	Non-Responsive	Discovered from Tom Tom data summary. Left message with Rene Whalen. No Response.
BridgeCom International, Inc.	4	Will Not Provide Data	Purchased by Broadview Network Holdings
Bridgevoice, Inc.	4	Will Not Provide Data	International voice carrier.
Broadband Dynamics, LLC	2	Will Not Provide Data	Cannot determine what this company does- most likely reseller
Broadcore, Inc.	2	Will Not Provide Data	Reseller, data will be provided through Level 3.
Broadstar, LLC	3	Will Not Provide Data	Offers broadband within rental/condo communities. not public, more a reseller to communities
Broadview Networks	2	Will Not Provide Data	Reseller
BroadvoxGo!, LLC	3	Will Not Provide Data	Trunking and VoIP. not a provider.
Broadwing Communications	2	Will Not Provide Data	Broadwing's data will be provided by Level3
BT COMMUNICATIONS SALES LLC	4	Will Not Provide Data	Cannot identify services provided.
Budget Phone	4	Will Not Provide Data	Pre-pay phone- not a provider. Cannot identify website.
Buffalo Wireless	3	Non-Responsive	Not a Provider
BullsEye Telecom	2	Will Not Provide Data	Reseller, does not serve many NY customers, does not wish to participate.

Burlington Telecom	3	Will Not Provide Data	Not a broadband provider in NY.
Business Automation Technologies	2	Will Not Provide Data	Reseller, no NY customers
Business Productivity Solutions	4	Will Not Provide Data	Cannot determine services. Not a broadband provider.
Cable Positive	4	Will Not Provide Data	Provides educational programming about HIV/AIDS
Cable Services Company, Inc.	4	Will Not Provide Data	Provides broadband construction services, not broadband.
Cablevision Systems	4	Will Not Provide Data	This company provides internal networking and voice systems.
Call Catchers Inc.	4	Will Not Provide Data	Virtual receptionist- not a provider, not in NY.
Catskill Mountain Cablevision	4	Will Not Provide Data	Now owned by Mid-Hudson Cable
Cause Based Commerce Incorporated	4	Will Not Provide Data	Voice only.
Cavalier Telephone; Cavalier Business Communications; Cavalier Telephone and TV	2	Will Not Provide Data	Reseller, does not serve many NY customers, does not wish to participate.
CBN Connect, Inc.	3	Will Not Provide Data	Infrastructure/Backbone
Chain Lakes Cable	4	Will Not Provide Data	Company does not provide broadband to NYS customers.
Charter Communications Plattsburgh	4	Will Not Provide Data	
Cincinnati Bell	1	Will Not Provide Data	Discovered on FCC 477 list; does not offer wireline service in NY.
Cingular Wireless	3	Will Not Provide Data	Provides data through AT&T
Citizens Cablevision	4	Will Not Provide Data	Provides through Citizens Telephone of Hammond
Comcast Networks	3	Will Not Provide Data	
CommPartners, LLC	3	Will Not Provide Data	VoIP, co-location, reseller.
Communication Solutions Partners	3	Will Not Provide Data	Internet reseller previously researched. Website not active any longer.
Communications Network Billing, Inc.	4	Will Not Provide Data	Phone only
Comp Direct USA	3	Will Not Provide Data	Has nothing to do with broadband.
Computer SOS	4	Will Not Provide Data	Does not offer wireless to end user, only wireless networking.
ConnectMe, L.L.C.	4	Will Not Provide Data	Has nothing to do with broadband.
Cordia Communications Corp.	4	Will Not Provide Data	Phone only
CornerStone Telephone Company	2	Will Not Provide Data	Re-seller of Verizon services
Cox Communications	3	Will Not Provide Data	Does not provide services to New York State.
Crown Castle International	3	Will Not Provide Data	Does not provide end user services. Infrastructure only.
CSP Telecom	4	Will Not Provide Data	Voice services only.
Current Communications	4	Will Not Provide Data	Discovered on WISPA list, No wireless offerings.
Custom Network Solutions	3	Will Not Provide Data	Telecom solutions, T1, VoIP, Reseller.
cyberMIND	4	Will Not Provide Data	Does not provide broadband services.
Cypress Communications, Inc.	3	Will Not Provide Data	Not a BB provider. Trunking/colocation, etc.
DANC	4	Will Not Provide Data	DANC is primarily a backbone infrastructure company
Deposit Cable Television Inc.	4	Non-Responsive	Phone out of service; no online information (3/22/10)
Devine Communications, Inc.	4	Will Not Provide Data	Cannot identify company. Does not provide broadband.
DFT Communications/Netsync	2	Will Not Provide Data	
DHAKA TELECOMMUNICATION CORP	4	Will Not Provide Data	Bangladesh Not a NY/US provider
diDi Wireless Communications	4	Non-Responsive	Not a Provider
Direcway	3	Non-Responsive	Satellite (?) service, will attempt to add when available in NYS
Dish Network	3	Will Not Provide Data	Television only
Douglas Computing Tech	2	Will Not Provide Data	Reseller, few NY customers, not willing to participate.
Downsville Community Antenna	4	Will Not Provide Data	Planning to close in summer 2010
Doylestown Cable TV	3	Will Not Provide Data	Does not serve NY.
Dream Catcher Communications	4	Will Not Provide Data	Provides advertising & marketing to NYS agencies and government offices
DSCI	2	Will Not Provide Data	Business only reseller. Left message.
DSL Communications, LLC	3	Will Not Provide Data	Cannot determine companies services.
DSL Extreme	2	Non-Responsive	Identified as a reseller, low priority for R4 outreach.
DSL.net	4	Will Not Provide Data	Company dissolved in December 2009.
DSLi	3	Will Not Provide Data	Serves S. Florida only

Earthlink	2	Will Not Provide Data	Reseller
East 2 West Networks Inc.	4	Non-Responsive	Phone disconnected; web site cannot be found.
East Telecom, Inc.	4	Will Not Provide Data	No website or contact information
ECR Voice, LLC	4	Will Not Provide Data	Phone services only.
Electric Lightwave	2	Will Not Provide Data	Purchased by Integra Telecom, which serves only the Northwest
Empire City Subway	3	Will Not Provide Data	Not a broadband provider.
Empire One Telecom (EOT)	2	Will Not Provide Data	Reseller
Encompass Communications	4	Will Not Provide Data	Calling Card Services
Endstream Communications, LLC	3	Will Not Provide Data	Does not supply end-user internet.
Engineered Communication Systems, Inc	4	Will Not Provide Data	Cannot verify company type- no valid website.
Enhanced Communications Network, Inc.	4	Will Not Provide Data	Voice only. From website: leading telecommunications carrier providing local service in California, New Jersey and New York.
Enventis Telecom Inc.	2	Will Not Provide Data	Reseller, does not serve many NY customers, does not wish to participate.
Equant, Inc.	4	Will Not Provide Data	Not a broadband provider.
Ernest Communications	4	Will Not Provide Data	Business only reseller.
Eschelm Telecom	3	Will Not Provide Data	Owned by Integra Telecom, which serves only the Northwest
Eureka Telecom	4	Will Not Provide Data	Cannot identify company- Eureka Telecom or Eureka Broadband.
EURO CONNECT	4	Will Not Provide Data	Voice services only.
Evercom Systems, Inc.	3	Will Not Provide Data	Does not provide broadband services.
eVolve Business Solutions LLC	4	Will Not Provide Data	VoIP only.
Evolve IP, LLC	3	Will Not Provide Data	Cloud computing- not a provider.
ExteNet Systems	3	Will Not Provide Data	Identified as broadband equipment business for wireless companies.
FASTNET	4	Will Not Provide Data	Discovered on WISPA list, may be part of PAETEC and does not have wireless.
Fidelity Voice Services LLC	3	Will Not Provide Data	Not a provider for NY.
Fionda VOIP, LLC	4	Will Not Provide Data	VoIP company- may not be in NY.
First Communications, LLC	3	Will Not Provide Data	Fiber backbone in NY. Will make contact for R5 for middle-mile.
Fribley Enterprises	4	Will Not Provide Data	Phone out of service; no online information
Gafachi	3	Will Not Provide Data	Provides wholesale VoIP services to providers and resellers.
GAW High Speed Internet	4	Will Not Provide Data	Does not appear to serve NY
Global Capacity Group, Inc.	4	Will Not Provide Data	Provides network services to telcom industry. Not a provider to end users.
Global Crossing	4	Will Not Provide Data	Letter indicates they cannot provider in 7-10 days.
Global Protection Communications Systems	3	Will Not Provide Data	Provides fiber infrastructure.
Globalinx	4	Will Not Provide Data	Reseller, VOIP. No applicable to program.
Globalnet Telecom, Inc.	4	Will Not Provide Data	Hosted PBX provider- no broadband.
GlobalPhone Corp.	4	Will Not Provide Data	Hosted PBX provider- no BB
Gore Mountain Cable TV	3	Will Not Provide Data	Cable TV only- PSC lists their franchises as 'No Broadband'
Granite Telecommunications, LLC	2	Will Not Provide Data	Reseller, does not serve many NY customers, does not wish to participate.
Great North West Telegraph Co	4	Will Not Provide Data	Company is closed.
GreatCall, Inc.	3	Will Not Provide Data	No data- cell/voice only
GTC Communications	3	Will Not Provide Data	Cannot identify company.
Hancel, Inc.	4	Will Not Provide Data	Cannot find any information on this company.
Hancock Video	3	Will Not Provide Data	Hancock Video does not provide broadband.
Hickory Tech	4	Will Not Provide Data	Added in R5, found on 477 data. Does not serve NY.
High-Speed Solutions	2	Will Provide Data	Reseller
Hilltop Communications, Inc.	3	Will Not Provide Data	Part of GTEL (Germantown Telephone)

Horizonone Communications, Quantumlink Communications, Voip Communications, Optic Communications, ANI Networks	4	Will Not Provide Data	Voice services only.
Hotwire Communications, Ltd.	2	Will Not Provide Data	Reseller, does not serve many NY customers, does not wish to participate.
Hudson Valley DataNet	3	Will Not Provide Data	Merged with Lightower Fiber networks.
Hughes Network Systems	1	Will Not Provide Data	Satellite company; did not send data.
iBasis	4	Will Not Provide Data	Voice services.
iCore Networks, Inc.	4	Will Not Provide Data	Phone services.
IDT Corporation	4	Will Not Provide Data	Phone services.
IKANO	3	Will Not Provide Data	No end-users. Infrastructure only.
InPhonex.com, LLC	4	Will Not Provide Data	Phone services.
Insight Broadband	3	Will Not Provide Data	Serves only Ohio and Kentucky
Integra Telecom	3	Will Not Provide Data	Provides broadband in the Northwest
Integrated Services, Inc.	4	Will Not Provide Data	Voice services.
Intellifiber Networks	3	Non-Responsive	Infrastructure fiber for business and providers. No end users. Will look for middle mile in future rounds.
Interface Security Systems, LLC	4	Will Not Provide Data	Not a provider.
InterGlobe Communications	2	Will Provide Data	Reseller- low priority for R4 outreach
Internet Professionals & Network Solutions (IPNS)	2	Will Provide Data	Reseller- low priority for R4 outreach
Internet@ntc, Inc.	4	Will Not Provide Data	No idea who or what they are/do.
Interstate FiberNet, Inc.	4	Will Not Provide Data	Part of Deltacom- now part of Earthlink Business. Business only.
ION	3	Will Not Provide Data	Infrastructure only.
IP Communications, LLC.	4	Will Not Provide Data	Phone services.
IP Networked Services, Inc.	3	Will Not Provide Data	Business only reseller.
IPC Network Services, Inc.	4	Will Not Provide Data	Network equipment business- not a provider
Jet Wave Corporation	3	Will Provide Data	Email sent to Mr. Klein- cannot find any information on this company.
JetWeb	1	Non-Responsive	May be out of business
Jivetel Communications	4	Will Not Provide Data	Voice only.
Kosmaz Technologies LLC	4	Will Not Provide Data	Voice services only.
LaunchNet	2	Will Provide Data	Reseller
LCR Telecommunciations, LLC	4	Will Not Provide Data	Wholesale long distance.
LDC Telecommunications Inc	4	Will Not Provide Data	Cannot identify company. website blocked.
LDMI Telecommunications, Inc.	3	Will Not Provide Data	Same address as Talk America; website goes to Cavalier.
LI Sky	4	Non-Responsive	Discovered in R5. Not a Provider
Light Tower Fiber Long Island LLC	1	Will Not Provide Data	Cannot provide service within 7-10 days.
LightEdge Solutions, Inc.	3	Will Not Provide Data	Does not provide broadband to NY customers, does not wish to participate.
Lightower	3	Will Not Provide Data	Cannot provide service within 7-10 days.
Lightspeed Fiber Network	3	Will Not Provide Data	Lightspeed closed; phone transfers to Thalle Industries Inc., which does not provide broadband services.
LightSquared LP	3	Will Not Provide Data	Wireless backbone/wholesaler.
Lightyear Network Solutions, LLC	2	Will Not Provide Data	Reseller- may not fit 7-10 day req.
Line Systems, Inc.	2	Will Not Provide Data	Reseller.
Localnet	4	Will Not Provide Data	Dial up service only
Looking Glass Networks, Inc.	3	Will Not Provide Data	Acquired by Level3 Communications in 2006
Luzip Telecom Inc.	4	Will Not Provide Data	Voice only.
M5 Networks, Inc.	4	Will Not Provide Data	Voice only.
Magellan Hill	4	Will Not Provide Data	Telecom management company.
Matrix Telecom, Inc.	4	Will Not Provide Data	Reseller.
McGraw Communications, Inc.	3	Will Not Provide Data	Business only reseller, co-location, etc.
MCI Communications Services, Inc.	3	Will Not Provide Data	Voice only- data services provided by Verizon.

MCImetro Access Transmission Services LLC	3	Will Not Provide Data	Cannot identify.
Mediacom	4	Will Not Provide Data	Does not provide broadband to NY customers
Megapath	2	Will Not Provide Data	Requested removal from call list.
Meriplex Communications, Ltd.	2	Will Not Provide Data	Reseller, no NY customers
Metropolitan Fiber System of New York	1	Will Not Provide Data	Verizon Business Global letter indicates MFS cannot provide in 7-10 days
Metropolitan Telecommunications Holding Company	3	Will Not Provide Data	Reseller, does not provide broadband.
MFS of New York, Inc.	3	Will Not Provide Data	Verizon Business Global letter indicates MFS cannot provide in 7-10 days
Middleburgh Telephone	3	Will Not Provide Data	Seamless Geoport Communications does not provide BB
Milestone Communications of NY	3	Will Not Provide Data	Does not provide broadband to NY customers
Millicorp	4	Will Not Provide Data	VoIP and voice only.
Mitel Netsolutions Inc.	2	Will Not Provide Data	Reseller.
MIX NETWORKS, INC.	4	Will Not Provide Data	Voice services.
MKL.net	4	Non-Responsive	Discovered in R5. Not a Provider
My Tel Co, Inc.	4	Will Not Provide Data	part of Cordia- VoIP only.
Navigator Telecommunications, LLC.	4	Will Not Provide Data	Voice services
NBC TV	3	Will Not Provide Data	NBC TV - does not provide broadband services
NECC TELECOM	4	Will Not Provide Data	Voice/long-distance service.
Net One International, Inc.	4	Will Not Provide Data	Voice/long distance/calling cards
NetCarrier	4	Will Not Provide Data	Voice/pbx/data. not a bb provider.
Netifice Communications	3	Will Not Provide Data	purchased by Megapath in 2006
Netlogic, Inc.	2	Will Not Provide Data	Reseller, does not serve many NY customers, does not wish to participate.
Netsville	4	Will Not Provide Data	Discovered on WISPA list. Does not provide wireless to end user-networking only.
Network Billing Systems LLC	2	Will Not Provide Data	Reseller.
Network Communications International Corp.	4	Will Not Provide Data	Provides voice services for inmate/correctional population
Network Innovations	1	Will Not Provide Data	Provides broadband in MA & NH; very limited data service in NY
Network Operator Services, Inc	3	Will Not Provide Data	Cannot identify this company.
Network Service Billing, Inc.	4	Will Not Provide Data	Voice/long-distance services
New Edge Networks	2	Will Not Provide Data	Reseller that cannot provide within 7-10 days.
New Jersey DataNet Telecom, LLC	3	Will Not Provide Data	Lightower Fiber Acquired DataNet Communications Group.
New York RSA 2 Cellular Partnership (Verizon Wireless)	3	Will Not Provide Data	Provides data through Verizon wireless/Cellco Partnerships
NexGen Networks Corporation	2	Will Provide Data	Non responsive in previous rounds.
NextGen Telephone	4	Will Not Provide Data	NextGen Telephone has ceased operations effective January 24, 2011.
Nextlink Wireless	2	Will Not Provide Data	
NextWave Wireless	2	Will Not Provide Data	No end user service
nexVortex,Inc.	2	Will Not Provide Data	Reseller.
NightOwl Internet Gateway	3	Will Not Provide Data	Email indicated company provides BB primarily in Missouri; not in NYS
NobelTel	4	Will Not Provide Data	Voice services only
North Penn Telephone	3	Will Not Provide Data	Offices located in NY, does not serve NY.
Northeast Optic Networks	3	Will Not Provide Data	Merged with Sidera
Northland Networks	2	Will Not Provide Data	Northland leases all of its facilities from its parent company, Oneida County Rural Telephone.
Northstar Telecom	3	Will Not Provide Data	Called previously- not responsive. May not provide in NY.
NOS Communications, Inc.	4	Will Not Provide Data	Toll free and out-bound telephone services
NOSVA Limited Partnership	4	Will Not Provide Data	Same as NOS communications- voice services only.
NTCNet Telecom, Inc.	3	Will Not Provide Data	NTCNet Telecom, Inc. is a small CLEC that operates as a subsidiary of Newport Telephone Company.

Nuvox	4	Will Not Provide Data	
NYSYS Broadband	1	Will Not Provide Data	Discovered on WISPA list. Business only fixed wireless in Rochester area. Called 12/14 and left voicemail.
Ojo Service LLC	4	Will Not Provide Data	Video/voice service.
OLS Inc.	4	Will Not Provide Data	Cannot identify this company or its services.
Omnipoint Communications	3	Will Not Provide Data	Small northeast wireless company, acquired by VoiceStream which is now T-Mobile.
One Communications	2	Will Not Provide Data	
One Source Networks	2	Will Not Provide Data	Global partner- reseller.
OneLink Communications, Inc.	4	Will Not Provide Data	Company located in Puerto Rico
Online Image	4	Will Not Provide Data	Discovered on WISPA list. Does not supply BB.
OnWav, Inc	2	Will Not Provide Data	Reseller- does not serve NY.
Open Access	4	Will Not Provide Data	Discovered on WISPA list. Website redirects to Lightower Fiber
Open Access Inc.	3	Will Not Provide Data	Open Access is now LightTower Communications
Optimum TV	3	Will Not Provide Data	Company provides data through CSC holdings
Pac-West Telecomm, Inc.	3	Will Not Provide Data	Broadband Infrastructure
PAD Business Solutions	2	Will Not Provide Data	Reseller, does not serve many NY customers, does not wish to participate.
PAETEC	2	Will Not Provide Data	Company acquired by Windstream.
Pannon Telecom, Inc.	4	Will Not Provide Data	International voice/phone
PCCW Global, Inc.	3	Will Not Provide Data	HKT is Hong Kong Telephone- PCCW is subsidiary.
Peerless Network of New York, LLC	3	Will Not Provide Data	Backbone voice services.
PeoplePC	2	Non-Responsive	Non responsive in previous rounds.
Phone.com, LLC	4	Will Not Provide Data	Voice only.
PNG Telecommunications	4	Will Not Provide Data	Phone services only
posTrack Technologies, Inc.	4	Will Not Provide Data	Voice services for colleges.
PowerDSL	3	Will Not Provide Data	Likely reseller, web search returns inactive website and little results.
PowerNet Global	2	Will Not Provide Data	Likely reseller, very unclear website
Premier Wireless	1	Will Not Provide Data	Premier Wireless was closed
Proximiti Technologies, Inc.	3	Will Not Provide Data	Primarily voice and phone tracking Offers internet as reseller.
QTel	4	Will Not Provide Data	VoIP- provides DSL in select areas only.
QuantumShift Communications, Inc.	3	Will Not Provide Data	Manages carrier service. Not a provider.
Qwest Communications Company	3	Will Not Provide Data	Qwest is now Century Link. http://www.centurylink.com/index.html
RAI Telecom, Inc.	3	Will Not Provide Data	VoIP services.
Razorline LLC	4	Will Not Provide Data	May not be in NY. Voice services.
Real Linx	2	Will Not Provide Data	Reseller
Reliance Globalcom	2	Non-Responsive	Reseller
RGT Utilities, Inc.	4	Will Not Provide Data	Utility company in Calif. cannot identify website or more information.
RGTS (Rockefeller Group Technology Solutions)	2	Will Not Provide Data	Provides broadband to specific businesses, does not wish to be on the map, has confidentiality concerns; Legal department advised them not to participate (6/29/10 phone)
RNK Communications	4	Will Not Provide Data	Reseller/voice services- difficult to identify services provided. Not and end user BB provider.
SAVVIS Communications	3	Will Not Provide Data	Cloud, Colocation, VoIP, etc. No BB provider. Acquired by CenturyLink.
SBA Communications Corp.	3	Will Not Provide Data	Provides tower site management and locations for cell and wireless companies.
SBC	4	Will Not Provide Data	phone goes directly to AT&T.
Semperon	2	Will Not Provide Data	Reseller with network partnerships
Silv Communication Inc.	4	Will Not Provide Data	Worldwide telephone service. Not a BB provider.
SinglePipe Communications	4	Will Not Provide Data	Company hard to find. Possible merge- voice services only.
Smart Choice Communications	2	Will Not Provide Data	Cooperative, but waiting until reseller decision made.

S-One Communications, Inc.	3	Will Not Provide Data	Cannot identify this company or services it provides.
Spa Net	3	Will Not Provide Data	Discovered on WISPA list but does not advertise wireless on website.
Spectrotel, Inc.	2	Will Not Provide Data	Reseller.
Speedus	4	Will Not Provide Data	Discovered on WISPA list. Nothing to do with BB service.
Stage 2 Networks	4	Will Not Provide Data	Voice and Hosted business phone
Sterling Telecom	2	Will Not Provide Data	Quote website: Wholesaler of Verizon Phone Service to Businesses.
Stratos Offshore Services Company	3	Will Not Provide Data	Provides communication services to US military and government entities outside of the country.
T2 Technologies	2	Will Not Provide Data	Reseller, may be business only. Not sure where/who they serve.
TCE Net	1	Will Not Provide Data	Company has 12 wireless customers, is not advertising to expand, will phase out these customers. Primarily serves dial up customers.
TCO Network, Inc.	2	Will Not Provide Data	Reseller, may be business only.
TCSweb Communications	4	Will Not Provide Data	Discovered on WISPA list. Website not active, no good Google results.
TDS Telecom	3	Will Not Provide Data	Provides data under 6 other subsidiaries
Tekmenwireless	3	Will Not Provide Data	Not a BB Provider
Telco Experts, LLC	2	Will Not Provide Data	Reseller
TelCove	3	Will Not Provide Data	Website redirects to Level 3.
Telcove	3	Will Not Provide Data	Website redirects to Level 3.
Telecom	2	Will Not Provide Data	From internet: dba Telecom and Verizon
Telefonica USA	3	Will Not Provide Data	Reseller, does not provide broadband.
Telekenex, Inc.	2	Will Not Provide Data	Business only reseller.
TelePacific	3	Will Not Provide Data	Reseller, no NY customers
Teleport Communications	3	Will Not Provide Data	Cannot identify company or services they provide.
Telergy Metro	3	Will Not Provide Data	Acquired by Con Ed communications, which was acquired by RNC.
Telesphere Networks Ltd.	4	Will Not Provide Data	Telephony services.
Telnes Broadband	2	Non-Responsive	Reseller, few NY customers, not willing to participate.
Telovations, Inc.	3	Will Not Provide Data	Reseller, no NY customers
TELZEQ Communications	4	Will Not Provide Data	Provides voice services and phone equipment
The Flat Planet Phone Company Inc.	4	Will Not Provide Data	Voice/telephoney/ PBX
Thinking Phone Networks, LLC	4	Will Not Provide Data	Voice only.
TNCI	2	Will Not Provide Data	Business only reseller.
Towerstream	1	Will Not Provide Data	Opt out - business only. Too much work to participate.
Transbeam	2	Non-Responsive	Reseller
Tremcom International, Inc.	4	Will Not Provide Data	Voice services, long distance, etc.
TruCom Corporation	3	Will Not Provide Data	Cannot identify this company or the services it provides.
TTI National, Inc.	4	Will Not Provide Data	From Website: for state-to-state, in-state long distance, local toll (limited availability) and international calls to existing customers. In addition Toll-Free service and Calling Cards are also available.
UCN	4	Will Not Provide Data	Cannot identify this company or what services it provides.
Unison Communications, Inc.	2	Will Not Provide Data	Business only reseller. Quote: We interconnect with major carriers.
UNITED STATES CELLULAR CORPORATION	3	Will Not Provide Data	Not located in NY.
US LEC	3	Will Not Provide Data	Merged with PAETEC, was a "Will Provide" for previous rounds but no data provided
V-Global Communications	**4**	Will Not Provide Data	Voice only
Valstar, Inc.	3	Will Not Provide Data	Cannot identify this company or services it provides.
Vanco Direct	3	Will Not Provide Data	Cannot identify this company, aka Global Capacity Direct.
Velocity Networks Inc	2	Will Not Provide Data	Business only reseller.

Verio	3	Will Not Provide Data	Verio offer web hosting among other things, NTT is global reseller.
Verizon Avenue Corp.	3	Will Not Provide Data	no longer active.
Verizon Business Global LLC	3	Will Not Provide Data	Email indicates they cannot provide in 7-10 days
Verizon Network Integration Corp.	3	Will Not Provide Data	
Verizon New York	3	Will Not Provide Data	
Verizon Online	3	Will Not Provide Data	
Verizon Select Services, Inc.	3	Will Not Provide Data	formerly GTE Comm. Corp., focus on long-distance service.
Verizon Wireless	3	Will Not Provide Data	Provides data as Verizon Wireless
Verizon Wireless	4	Will Not Provide Data	Verizon Wireless services are now reported under Cellco Partnership dba Verizon Wireless.
Verizon Wireless	3	Will Not Provide Data	tower management company for Verizon Wireless
V-Global Communications	4	Will Not Provide Data	Voice and VoIP services.
VIA ONE TECHNOLOGIES INC.	4	Will Not Provide Data	Cannot identify this company or services they provide.
Vocal IP Networx Ltd	4	Will Not Provide Data	Voice and telephony services only.
Voda Networks, Inc.	2	Will Not Provide Data	Reseller. Partnered with industry leading providers.
VoIPnet Technologies	4	Will Not Provide Data	Voice only.
VoIPStreet, Inc.	4	Will Not Provide Data	VoIP services only.
Vonage	4	Will Not Provide Data	Provides phone services only.
VPN Systems	3	Will Not Provide Data	Discovered on WISPA list. Does not provide BB service.
Warp Drive Products	3	Will Not Provide Data	Discovered on WISPA list. Does not provide BB service.
Wave2Wave Communications Inc	2	Will Not Provide Data	Company is a reseller, low priority, no outreach for R4
WavHost	3	Will Not Provide Data	Discovered on WISPA list. Webpage does not open, cannot get good search results on company.
WCS Wireless License Subsidiary, LLC	4	Will Not Provide Data	Cannot verify any information on company.
WDT	2	Will Not Provide Data	Reseller- unsure of service to NY.
White Fence	3	Will Not Provide Data	Company connects customers with broadband providers.
Wholesale Carrier Services, Inc.	2	Will Not Provide Data	Reseller- low priority for R4 outreach
WilTel Communications, LLC.	3	Will Not Provide Data	Acquired by Level 3.
Winstar	3	Will Not Provide Data	Company was reseller but since has gone bankrupt.
Worldlink USA Inc.	4	Will Not Provide Data	Unsure of actual company- best search turns up maritime communications company.
Worldwide Marketing Solutions	4	Will Not Provide Data	Research indicates website hosting, many pending lawsuits and scam reports.
Xand Corporation	3	Will Not Provide Data	Network systems- not BB provider
XCHANGE TELECOM CORP.	4	Will Not Provide Data	Voice services only.
Xcyncroj	4	Will Not Provide Data	Cannot identify company Phone number is out of service
XO Communications Services, Inc. (Affiliated Entity)	2	Will Not Provide Data	Reseller
Zayo Group	3	Will Not Provide Data	Reseller, no NY customers
Zone Telecom, Inc.	4	Will Not Provide Data	Voice services, VoIP, etc.

OFFICIAL APRIL 2013 UPDATE SUBMISSION TO THE NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION UNDER THE STATE BROADBAND INITIATIVE GRANT PROGRAM FOR THE STATE OF OHIO

April 1, 2013

TABLE OF CONTENTS

April 1, 2013

Ms. Anne W. Neville
SBI Grant Program Director
National Telecommunications and Information Administration
U.S. Department of Commerce
Room 4716
1401 Constitution Avenue, NW
Washington, DC 20230

Dear Ms. Neville:

Please accept this submission from Connected Nation on behalf of the state of Ohio's State Broadband Initiative (SBI) Grant Program, known as Connect Ohio.

Connected Nation and Connect Ohio congratulate the National Telecommunications and Information Administration (NTIA) and the Federal Communications Commission (FCC) on achieving the two-year anniversary of the National Broadband Map. Truly, now more than ever, the significance of complete and validated data through this effort is impacting lives in communities all across our great country. The Connect Ohio program and its collective stakeholder community continue to be faithful and energized contributors, and we are proud to play such a part in forging the innovation economy of the twenty-first century.

The artifacts that comprise this submission should be found to be compliant with the April 1, 2013, deadline for the semi-annual data update and in accordance with the terms of the July 1, 2009, Notice of Funds Availability (NOFA) and all subsequent clarifications pertaining to delivery of state-level mapping of broadband service availability. This packet includes:

Inventory of Deliverables, Connect Ohio: April 1, 2013

NOFA Requirement	Data Transfer Model	Data Description
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in Census Blocks of No Greater Than Two Square Miles in Area
Appendix A: 1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census Blocks Larger in Area Than Two Square Miles

Appendix A: 1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address
Appendix A: 3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points
Appendix A: 4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing
Appendix A: 4	n/a	Community Anchor Institutions-Narratives
VII.A.1(a)	n/a	Accuracy and Verification Report
n/a	DataPackage.xlsx	Worksheets of Contact Information, Record Count, and Provider Summary Table
n/a	n/a	List of Changes and Corrections to the Dataset
n/a	n/a	Non-Participating Provider (NPP) Narratives
n/a	n/a	Broadband Provider Roster and Participation Status

In addition, this data update submission should be found to be compliant with the additional program requirements instituted by the National Telecommunications and Information Administration since the time of the October 2012 SBI data submission for the Connect Ohio program. Specifically, these new requirements are:

SBI Data Transfer Model
The submission of the broadband dataset for April 1, 2013, is contained within the SBI Data Transfer Model as released on the Grantee Workspace on December 14, 2012. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information on each provider as possible.

Additional Submission Guidance
On February 8, 2013, NTIA released new guidance regarding the processing of wireless data, for both fixed and mobile broadband providers. All wireless provider coverage records have been reviewed and are in compliance with this grantee guidance for this April 2013 submission period. Even providers that did not have an update for this submission cycle were reviewed and data reprocessed as necessary for those records that were not yet in compliance with the new guidance.

This submission continues to follow the speed technology guidance released by the Program Office on August 9, 2012, to review speed tier codes in correspondence with technology of transmission codes. In the October 2012 submission, descriptions were provided in the methodology paper that offered an explanation for any submitted technology of transmission and speed combinations that were outside of the expected value range. That

practice continues in this submission as technology and speed combinations are reviewed and scrutinized; any questionable information supplied by providers is reviewed more in depth with the provider to ensure the information is accurately captured or a proper explanation is provided as to why the speed information should be submitted as supplied even if it falls outside the expected value range.

This submission also includes narratives describing the data and coverage estimation of non-participating providers. While Connect Ohio continues outreach to all providers prior to each submission period, the need to submit broadband service data for all providers regardless of their participation is evident as the SBI program continues into this seventh round of data submissions. The submission of this estimated broadband service area for providers that have not supplied data to Connect Ohio is essential in being able to portray a more accurate depiction of the current broadband landscape.

This April 2013 semi-annual data update under the SBI Grant Program continues to demonstrate our dedication to implementing the joint purposes of the Recovery Act and the Broadband Data Improvement Act (BDIA) by gathering comprehensive and accurate state-level broadband mapping data, developing state-level broadband maps, aiding in the development and maintenance of the National Broadband Map, and undertaking statewide initiatives for broadband planning.

Broadband Service Availability — Provider Outreach and Verification

This data update submission under the SBI program includes datasets for 96.85 percent of the Ohio provider community, or 123 of 127 total providers. There are 120 participating providers and 3 additional non-participating providers whose estimated coverage areas have been submitted. Of the 120 participating providers, 40 supplied an update to their network or coverage area(s), while 52 have reported no change. The remaining 28 represent providers who previously supplied data but were non-responsive in the April 2013 update effort; therefore, their previous dataset is being put forward as part of this compilation. A complete roster by provider depicting participation status and contact history is contained herein. The remaining 4 providers that are not represented in the attached datasets were non-responsive to multiple contact attempts.

As the aforementioned roster and attached methodology documentation will attest, it is the collective opinion of the Connect Ohio principals that all commercially reasonable efforts were made to account for 100 percent of the known Ohio broadband provider community, pursuant to this semi-annual data update submission.

Connect Ohio has also continued to perform broadband verification activities through several means. In addition to confirmation of service area(s) by each provider, Connect Ohio conducts field validation efforts. To date, 102 (80.31 percent) providers have been validated through field verification activities. Additional details on verification activities are contained within the Field Validation Methodology.

The Connect Ohio website (www.connectohio.org) continues to serve a prominent role in the outreach and data collection effort. This program asset provides a way for the general public to

participate in the process by offering interactive tools for users to test their connection speed, submit broadband inquiries, or contact a program representative.

As an indicator of stakeholder penetration, the Connect Ohio website encountered 21,904 unique visits during this reporting period (170,753) total to date for the life of the grant awarded on December 20, 2009. Additionally, this pronounced Web activity netted 78 broadband inquiries over this same reporting period 1,745 grant inception to date). The website also provides access to the My ConnectView™ interactive mapping application, which allows consumers and broadband providers to confirm or dispute the coverage represented on the broadband inventory map. These consumer-initiated actions are facilitated through the Connect Ohio website and the Connect Ohio interactive mapping tool (My ConnectView™) that offer the stakeholders the vehicles to provide information regarding availability in their respective service area, either in affirmation or contest of the reported data represented in the Connect Ohio mapping artifacts. Since the initial data collection and release of corresponding maps, feedback in the form of broadband inquiries has allowed Connect Ohio to identify additional areas that are in need of field validation, which is scheduled as soon as possible.

Community Anchor Institutions

Connect Ohio continues to make significant inroads to gather data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. This uptick in CAI data collection was further supported by NTIA's outreach to grantees reiterating the importance of this outreach. With the continued commitment of the Office of Information Technology we have continued to focus on a relationship-oriented approach with state-level agencies and organizations that generates more responses than general contact.

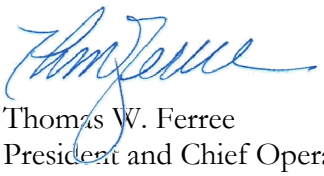
The Office of Information Technology continued working with various state groups to collect and obtain CAI location and connectivity information. Building on past success of the September 2012 Education Campaign, February 2013 was recognized as Public Safety Month where the public safety sector was the focus.

From our work in Ohio, as well as other states, we recognize the great value of this data to future collaboration efforts within the state as well as its value to the National Broadband Map. We plan to continue to bring best practices to the Connect Ohio efforts, along with an investment of both human and technical resources required to reach our goal of increasing the data that is secured and reported as part of this process.

The Connect Ohio program exists to improve data on the deployment and adoption of broadband services and to assist in the extension of broadband technology across all regions of the great state

of Ohio, as well as the United States and its territories through contribution to the National Broadband Map. We look forward to the continuing work ahead and improving upon our data collection methods.

Respectfully submitted,



Thomas W. Ferree
President and Chief Operating Officer
Connected Nation, Inc.

OHIO COMMUNITY ANCHOR INSTITUTIONS METHODOLOGY

Since the October 2012 submission, the sector-specific approach included a month-long public safety campaign in February 2013.

Physical address information continues to be augmented through manual sourcing and geocoded by Connect Ohio through Esri ArcGIS software.

Connect Ohio continues to utilize a customized online survey hosted through SurveyMonkey, with a landing page on the Connect Ohio website that was developed during the first reporting period. Connect Ohio will continue to use these data-gathering tools for future targeted outreach efforts throughout the coming months leading up to the next reporting period. These materials are customized to fit the CAI categories as defined in the SBI NOFA. The survey can be accessed at this link: http://www.surveymonkey.com/s/R3RLVNG.

The Office of Information Technology continued working with various state groups to collect and obtain CAI location and connectivity information.

Connect Ohio has an ongoing mission to educate CAI throughout the state on the importance of participating in the project. Participation by these institutions will raise awareness about the importance of broadband connectivity and the need to report the requested data for inclusion on the National Broadband Map.

The greatest challenge with collecting CAI data continues to be educating the CAI about the Connect Ohio project as well as self-awareness of their own broadband connectivity (specifically upload and download speeds). When applicable, the Office of Information Technology will continue to be briefed on the current CAI data and provided information so it can assist with outreach and promotion within the state.

A CAI summary of all processed and submitted data is provided below:

CAI Type	Total	Physical Address	Lat/Long	Technology of Transmission	Download Speed	Upload Speed
K-12 Schools	9203	9203	9027	3484	2497	2458
Libraries	808	808	807	684	586	333
Healthcare	1456	1456	1456	5	5	5
Public Safety	3743	3743	3723	548	548	548
Higher Ed Institutions	960	960	954	17	12	11
Other Government	958	958	946	313	308	308
Other Non-Government	4210	4210	4210	31	21	16
Total	21338	21338	21123	5082	3977	3679

The CAI data is proving an invaluable resource to all components of the Connect Ohio effort. The data identifies potential local champions, sector trends, and opportunities for improvement as well as opportunities to educate CAI not familiar with their current connectivity.

SBI Data Submission Methodology

The submission of the broadband dataset for April 1, 2013, is contained within the SBI Data Transfer Model and additional components as released on the Grantee Workspace on December 14, 2012. Connected Nation (CN) has reviewed all literature that relates to the release and use of this data transfer model and recognizes that it does not replace or dictate how data is stored, processed, or displayed for the state, as it is meant primarily as a means to transfer the broadband data from all states and territories and populate the National Broadband Map in a seamless fashion.
Connected Nation has complied with the following guidance documents published by NTIA:

- Technical Mapping Guide, as released on the Grantee Workspace on March 24, 2011, was followed to ensure the completeness and validity of the submission through completion steps and checklists, completing the DataPackage spreadsheet, uploading broadband datasets into the Data Transfer Model, and checking the dataset using the SBDD_CheckSubmission receipt process.
- Naming Conventions and Category of End User, as released on the Grantee Workspace on March 26, 2012, was followed to ensure the consistency of individual file and zip package naming.
- Wireless Data Processing Guidance, as sent to SBI grantees on February 8, 2013, was followed to ensure that all fixed and mobile wireless provider coverage records are submitted to NTIA as separate, closed polygons whenever there is a variation in any of the required fields.

In addition to the methodologies contained herein, the Changes and Corrections documentation, as well as the DataPackage.xls containing contact information, the data dictionary, and a provider summary table, the following feature classes are submitted within the SBI Data Transfer Model for the state of Ohio.

Inventory of Deliverables, Connect Ohio: April 1, 2013

NOFA Requirement	Data Transfer Model	Data Description
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in Census Blocks of No Greater Than Two Square Miles in Area.
Appendix A: 1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census Blocks Larger in Area Than Two Square Miles.

Appendix A: 1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address.
Appendix A: 3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points.
Appendix A: 4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing.

The provider data collected by CN on behalf of the state of Ohio have been formatted per the given specifications and uploaded into the appropriate feature classes of the SBI Data Transfer Model. Wireline availability is contained within census blocks and road segments, wireless availability is contained as polygons of coverage areas, and middle-mile connections and Community Anchor Institutions are contained as point data. All speed data is contained at the census block, road segment, or wireless polygon level of availability. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information as possible.

Connected Nation has continued outreach to satellite providers on their availability, technology, and speed information, but granular coverage is not yet available. Submitted within the wireless feature class are the satellite companies providing service to Ohio as a polygon of the state boundary. Efforts will continue to collect, process, or otherwise create more granular satellite data based on availability analyses and guidance received from NTIA. Process development continues as well to be able to create more granular satellite coverage based on satellite equipment positioning and geographic inputs.

OHIO FIELD VALIDATION METHODOLOGY

CN focused a portion of its time on specific validation processes such as:

- conducting random spectrum analysis studies throughout the state using an Avcom PSA-37-XP spectrum analyzer;
- conducting mobile speed tests throughout the state using an iPhone, Android (or other smart phone) as well as provider-specific aircards (Sprint 3G/4G, Clearwire et al);
- identifying pre-selected, provider-submitted wireless transmit tower sites and cross-referencing data about that tower against the Federal Communications Commission (FCC) databases such as Antenna Structure Registration and/or the Universal Licensing System;
- cross-referencing Federal Registration Number data against available FCC Form 477 data as well as the FCC **CO**mmission **RE**gistration **S**ystem (CORES);
- validating provider submitted data (for example: latitude/longitude) using a handheld Garmin eTrex Summit GPS unit or GPS enabled software such as Microsoft *Streets & Trips*;
- locating physical wire-line attributes (such as Central Offices, Remote Terminals, CATV plant, etc.) and comparing them against provider submitted data; and

- conducting on-net and off-net speed tests using the FCC portal at http://www.broadband.gov/qualitytest/about/ or using the Ookla Net Metrics enabled speed test utility located on each of CN's program specific websites.

Additionally, CN cross-referenced numerous public documents in order to ensure that all known broadband providers were located and contacted. This included searching membership logs from trade associations (WISPA, WCAI, PCIA, etc.), the Cable Television Fact Book, Public Utility Commission records, Public Service Commission records, Chamber of Commerce, etc.

To date, Connected Nation's staff conducted on-site validation tests in Ohio on the following providers: 1 Touch Technology; Amplex Internet; Armstrong Utilities; Arthur Mutual Telephone; AT&T Inc.; Avolve; Ayersville Telephone Company; Bascom Mutual Telephone (d.b.a. BrightNet Bascom); Bellaire Television Cable Company Inc.; Benton Ridge Telephone (d.b.a. W.A.T.C.H. TV); Blue Sky Wireless; Broadband Networks (also d.b.a. Omnicity); Bryan Municipal utilities; Buckeye Cablevision Inc.; Buckland Telephone; Cable Coop Inc.; CenturyLink; Cequel Communications; Champaign Telephone Company (d.b.a. CTC); Cincinnati Bell Telephone Company LLC; Cincinnati Communications; CityNet Fiber; City of Dover; City of Wadsworth; Clearwire Corporation; Comcast; Conneaut Telephone Company; ConnectLink; Country Connections LLC; Coyote Wireless; CueBand; Dark Horse Wireless; Databit Solutions; Doylestown Communications; DuplexCom of Ohio LLC; Eagle Communications (d.b.a. Safe-T.net); FairPoint Communications (d.b.a. Germantown Independent Telephone, Columbus Grove Telephone, and Orwell Telephone); Falcon 1; Farmers Mutual telephone Company (d.b.a. Bright.Net North); Firewire Internet; Fort Jennings Telephone Company; Frontier Communications (d.b.a. Citizen's Communications); Fruend Enterprises Inc. (d.b.a. Access Ohio Valley); Glandorf Telephone Company Inc.; GLW Broadband; GMN Wireless; Hometown Cable Company (also d.b.a. g Wireless); Hocking Internet Technologies Ltd.; Horizon Telecom; Imagine Networks; Intelliwave LLC; J-B Nets LLC; Jefferson County Cable TV Inc.; Jenco Wireless; Kalida Telephone Company Inc.; King Office Supply; Leap; Level 3 Communications; LightSpeed Technologies; Mango Bay; Massillon Cable TV Inc.; McClure Telephone Company; Mechom; Mediacomm Indiana LLC; MegaPath Inc.; MetaLINK; Middle Point Home Telephone Company; Mikulski Communications LLC; Mobilecomm (d.b.a. Heavenwire); Nelsonville Cable Television; New Era Broadband LLC; New Knoxville Telephone (acquired KeyOn Communications Inc.); NexGen Access; NorthWest Net Inc.; nTelos (d.b.a. Ohio Fibernet); OneCommunity; Ottoville Mutual Telephone Company; R.A.A. Services; Redbird Internet Services; Sherwood Mutual Telephone Association; Slane Telecom (d.b.a. Celerity Networks); Southern Ohio Communication Services Inc.; Sprint Nextel; StratusWave; Suddenlink; Sycamore Telephone; TDS Telecommunications Corp.; Telephone Service Company; Time Warner Cable Access (d.b.a. Insight Communications of Central Ohio LLC); T-Mobile; UData Net; Vaughnsville Telephone Company; Verizon Communications; Wabash Mutual Telephone Company; WaveLinc Communications; Wide Open West Finance LLC; Wilkshire Wireless; Windstream (f.k.a. PAETEC Communications. Inc., Cavalier Telephone, and Talk America, Inc.); XO Communications LLC; Your Digital Partner; and Zayo Group LLC (also d.b.a. First Communications).

In addition to the field verification tests that have been conducted, Connected Nation has also conducted work in the field to collect information for the non-participating providers, Bellaire

Television Cable and Giga-Data (Firewire), which, by nature of the methodology required for this collection, are also included in the above list.

From program initiation through this reporting period, CN has completed in-the-field validation testing against 102 companies (out of a universe of 127 viable providers) totaling 80.31 percent within the state of Ohio. This percentage also considers the non-participating provider records submitted to NTIA as may be contained herein (see "Data Submission and Coverage Estimation of Non-Participating Provider" below).

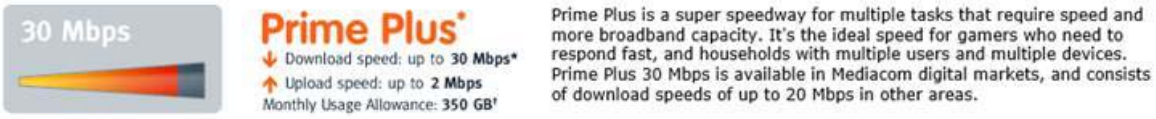
CN has also continued to review provider datasets for accurate speed information, platform listings, and other intricacies that may fall outside of the standard SBI Data Transfer Model parameters, as published on the NTIA Grantee Workspace on December 14, 2012. Any providers whose submitted coverage and attributes are anticipated to come into question have been further reviewed and confirmed; details on a case-by-case basis are presented below.

Cequel Communications
Issue: Technology of transmission code 40 with maximum advertised download speed in tiers 6 and 7, lower than expected value range for the technology.
Resolution: Provider representative confirmed that DOCSIS 3.0 is indeed in use, but speeds have not been turned up higher yet.

Massillon Cable TV, Inc.
Issue: Technology of transmission code 40 with maximum advertised download speed in tier 7, lower than expected value range for the technology.
Resolution: Provider website confirms use of DOCSIS 3.0 with the lower speeds.

- DOCSIS 3.0 High- Speed Data- Maximize your online experience with download speeds up to 10 Mbps, upload speeds up to 1.5 Mbps and 3 email addresses included for only $159.95/month.

Mediacom Indiana LLC
Issue: Technology of transmission code 41 with maximum advertised download speed in tier 8, higher than expected value range for the technology.
Resolution: Provider website advertises 30 Mbps download service; screenshot below.



Data Submission and Coverage Estimation of Non-Participating Providers (NPP)

As part of its ongoing broadband mapping efforts, CN has developed a series of processes with the goal of submitting coverage estimation mapping data to NTIA for every known and qualifying last-mile broadband provider, regardless of platform type (cable modem, DSL, fixed wireless, etc.).

Appendix A presents full reports on the estimated broadband service territory for the providers in this state that have either been non-responsive or that have refused to participate in the SBI mapping initiative as of April 2013. These coverage estimation reports are for non-participating providers whose data has not been previously submitted to NTIA in past mapping cycles.

The section below provides a summary of the status of CN's outreach and findings on all non-participating provider coverage for the April 2013 SBI submission.

Bellaire Television Cable Company
Coverage for this NPP is being submitted for the first time; please find a white paper on provider outreach and coverage estimation in Appendix A.

Giga-Data
Coverage for this NPP is being submitted for the first time; please find a white paper on provider outreach and coverage estimation in Appendix A.

GLW Broadband
The coverage estimation for GLW Broadband was not updated from the previous submission in October 2012. The full white paper containing the most recent coverage estimation for this provider can be found within the October 2012 submission to NTIA.

PROVIDER VALIDATION METHODOLOGY

Broadband providers maintain their service area data in many different formats, all in varying levels of complexity and granularity. In order to ensure that the data required by the NTIA is standardized across all providers and that it is as accurate as possible, CN translates and formats the data that providers are able to supply into a GIS shapefile and produces maps for the provider to review. The resulting map(s) and review process allow for providers to see their service area in a geographic format – for some providers, this is the first time they have seen maps of their broadband service area. Having the mapped service area allows providers to quickly identify any issues that appear in the data representation, whether the issue is in the data translation into a GIS format or from the original data collection and submission. Often data is provided from various sources and through the review and revision process, local engineers who operate the networks and work in the field are able to ensure that the tabular data that has been submitted is accurate and represents the real-world network extent. Any issues in how the service area is represented on the map(s) are remedied by CN, whether they are additions, removal of service, or any other revisions. Revised maps of service area representations are sent to the provider for review and approval; CN will revise data and return maps as many times as necessary until the provider is in agreement that the map represents their service area as accurately as possible. Once the review process has been completed and final approval of the data is provided, the data is deemed ready for NTIA submission.

Once the data collection has been aggregated at a statewide level, static maps of statewide and county-level availability are produced and made publicly available. In addition, consumers can visit the interactive online tool, My ConnectView, to create customized views of broadband service areas

and analyze corresponding demographic information. Leveraging broadband service data on various platforms allows for public users, providers, and other stakeholders to review, scrutinize, and provide feedback on the represented data. This feedback becomes a validation method in itself, as consumers submit inquiries to CN either affirming where service is not available or identifying areas where broadband service is shown on the map, but in actuality is not available. This allows for a follow-up to providers regarding revisions to the data as it is represented; it also allows for CN to identify locations where on-site visits may be necessary to complete field validation of available services. Public feedback on all forms of mapping products serves as a localized validation method for provider-supplied information and allows CN to resolve inaccuracies as they are identified to ensure that only the highest quality information is provided to stakeholders.

Additionally, non-participating provider narratives that were submitted in previous mapping cycles are subjected to the same level of scrutiny. Occasionally, a provider may elect to voluntarily participate (thus eliminating the need for future data estimation activities in the field). However, more often than not, the NPP narrative is updated with a combination of data gleaned from the provider's website, data obtained through FCC research and/or data collected/verified in the field by a CN staff engineer.

Estimates derived from provider-validated data indicate that approximately 1.29 percent of Ohio households do not have terrestrial fixed broadband service available, and approximately 0.23 percent of Ohio households have neither mobile nor fixed broadband service available.

Within rural areas of the state, results derived from provider-validated data indicate that approximately 2.57 percent of rural Ohio households do not have terrestrial fixed broadband service available, and approximately 0.44 percent of rural Ohio households have neither mobile nor fixed broadband service available. Please note that the availability estimates presented are based on Census 2010 household information.

The estimates above, in accordance with NTIA's definition of available broadband service as specified in the SBI NOFA, include broadband service with download speeds of at least 768 Kbps and upload speeds greater than 200 Kbps.

In addition, due to the nature of the SBI data collection methodology as defined by the NTIA and based on both census block geographic units and street segment data, the estimates of broadband availability derived from provider-validated data may include an overstatement of the actual number of households with broadband availability. Under the census block-based data collection method, a provider will typically report broadband availability for an entire census block whether its network is present across the whole or only a subset of that census block. This potential overestimation at the census block level can be amplified as the data is aggregated across the entire state.

WIRELESS METHODOLOGY

Broadband Service Availability in Provider's Service Area
Wireless Services Not Provided to a Specific Address

Data solicited from a fixed wireless provider to create propagation models include, but are not limited to:

1. The name of the structure.
2. Whether the transmitting device is operational or proposed.
3. The maximum advertised downstream speed, the maximum advertised upstream speed.
4. The typical downstream speed, the typical upstream speed (peak periods for both).
5. The frequency range of spectrum being used (as prescribed by NTIA). This may include (but is not limited to) spectrum authorizations identified within the Federal Communications Commission (FCC) Universal Licensing System (ULS) database or located on the FCC's Spectrum Dashboard. This research often proves to be exceptionally effective when estimating the coverage area of an NPP.
6. The primary population center(s) being served (for geopolitical boundary reference).
7. The physical address of the transmit site (in the event latitude/longitude is unavailable from the provider this allows a quick reference point for geocoding).
8. Latitude in either Degrees, Minutes, and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
9. Longitude in either Degrees, Minutes and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
10. Antenna pattern (e.g. omnidirectional, 180°, 120°, 90°, etc.).
11. Azimuth of antenna (e.g. 360° with magnetic declination if known).
12. Approximate transmit radius (in feet, miles, or kilometers).
13. Polarity of transmit antenna (Vertical or Horizontal).
14. Transmit antenna gain (in dBi).
15. Line loss (applicable only to providers using coax, heliax, waveguide or other forms of cabling – excludes power-over-Ethernet devices).
16. Mechanical and/or Electrical beam tilt (if applicable).
17. Equipment Manufacturer (allows easy cross-reference against manufacturer's specification sheet).
18. Power output of the transmitting device (if unknown, FCC standards or manufacturer specifications are applied).
19. AMSL at base of tower site.
20. Antenna centerline AGL (height of antenna above ground level measured at the centerline of the actual antenna).
21. Foliage factors (Evergreens/Deciduous and percent of ground cover).
22. Ground Clutter (primarily used in rural areas to account for foliage and in metropolitan areas to account for types and heights of buildings if known).

23. Average gain of receive antenna.
24. Receive antenna is estimated at height above average terrain (HAAT) of 6.2 meters/20 feet.
25. Federal Registration Numbers (if applicable) which may allow opportunities to cross-reference and/or obtain additional data from the FCC's ULS and the **CO**mmission **RE**gistration **S**ystem.

Propagation modeling combines scientific data and empirical mathematical formulation for the characterization of radio wave propagation as a function of frequency, distance, and other conditions. Propagation software(s) typically use the Irregular Terrain Model (also known as Longley-Rice) of radio propagation for frequencies between 20 MHz and 20 GHz. This model is based on electromagnetic theory and statistical analyses of the combination of terrain features and radio measurements, then predicting the median attenuation of a radio signal as a function of distance and the variability of the signal in time and in space. For metropolitan areas, the software can typically be adjusted to use the Okumura-Hata model, which accounts for predicting the behavior of cellular transmissions in areas where buildings are the primary obstructions. The resulting product from either model depicts a graphical illustration of the theoretical propagation characteristics of a selected frequency range based on defined variables (receiver sensitivity of the home/mobile device, foliage factor, and digital elevation terrain input).

After converting propagation models into a geospatial format, additional processing is completed to remove the small pixels representing service present in the resulting dataset. These areas are initially created based on the parameters entered in the software from the provider equipment information, the underlying data parameters of elevation, hill shade, etc., and the limitations of the software itself to display a broadband service area as accurately as possible. Generally, these random pixel striations appear as a result of signal levels reaching the highest elevated points within the prescribed radius. Typically, while this pixilation anomaly shows legitimate areas where signals can be received, these highly elevated points may have exceedingly sparse populations or are entirely void of population. As a result, and congruent to the *Wireless Technology Methodologies and Business Logic* white paper submitted to NTIA on January 20, 2011, all independent pixels representing service that are less than 0.125 square miles in area have been removed from the geospatial representation of each wireless provider.

BROADBAND INQUIRIES METHODOLOGY

CN collects consumer feedback in the form of broadband inquiries (BBIs). These inquiries represent any type of communication received from the public regarding broadband service. Once BBIs are received across the state, this information is overlaid with the broadband availability information which was collected through the SBI program. This allows for a real-world comparison of the broadband landscape to the information received from broadband inquiries. Consumers submitting these inbound comments and/or inquiries are able to provide information regarding five categories: 1) residents who do not have broadband but want it; 2) residents who have broadband but want a different provider; 3) residents who do not have broadband, but the broadband inventory maps

indicate that they do; 4) residents who have broadband but want a faster connection speed; and 5) residents who have broadband but want a less expensive service option.

BBIs are submitted frequently by consumers via the Connect Ohio website. Inquiries often seek help to identify local broadband provider options, or to learn when a specific provider may be able to provide service to that consumer. Consumer comments also provide information which may help modify maps with actual service area information. The primary objectives of CN regarding these inquiries are 1) to improve the accuracy of the state maps with submitted consumer information and follow-up field research; 2) to provide broadband options to consumers through cooperation with mapped providers and by facilitating new broadband service options; and 3) to map and analyze information from consumers about areas of unmet broadband demand and alternatives to currently mapped services. A prime example of the second option is the utilization of the Rural Utility Service satellite eligibility tool. By simply entering the consumer's address, the CN engineer can quickly determine if the consumer meets the initial qualification status for BIP satellite subsidies.

New BBIs are assigned to either the GIS department or the Engineering & Technical Services (ETS) team depending on the category entered by the consumer on the website submission form. The GIS or ETS team members respond to each inquiry according to the information entered by the consumer. Many BBIs can be resolved through desktop research; however, if a BBI requires research in the field, the assigned ETS team member conducts such research when performing field validations in the area of the inquiry, or at another such time as is practical and appropriate. GIS and ETS team members respond to and conclude BBIs via telephone contact and/or e-mail communication.

The broadband inquiry process has been implemented in each of the CN state programs with successful results. Altogether CN has received over 18,839 broadband inquiries since 2007, allowing the state programs to evaluate each inquiry for broadband demand and data verification. These inquiries are continuously examined against current broadband availability, updated every six months, to determine if previously unserved households have been expanded to and can now receive broadband at their residence. This database of broadband inquiries has also allowed the CN state programs to aggregate demand in concentrated areas to show providers the exact locations where the population has made it clear that they would purchase broadband if it was made available to them. Providers in the states have responded to this process and have expanded to areas knowing that their investment will be worthwhile. Data verification methods have also proven successful, as the state programs have been able to show those inquiries that indicate the broadband service areas are misrepresented on the map to providers, who then verify where service cannot reach in regard to that residence(s). The broadband coverage in these states has been altered to create a more accurate map based on the inquiries submitted by the public.

During this reporting period, the Connect Ohio project has received a total of 78 inquiries (1,745 grant inception to date). As more inquiries are submitted to Connect Ohio, a more thorough validation of the broadband landscape can be performed, while also allowing providers to see which areas have a high demand for broadband adoption.

My ConnectView Methodology

My ConnectView is an interactive online mapping tool for viewing, analyzing, and validating broadband data. Developed using Esri's ArcGIS for Server and Adobe's Flex Framework and hosted and maintained by Connected Nation, My ConnectView is a multi-functional, user-friendly way for local leaders, policymakers, consumers, and technology providers to devise a plan for the expansion and adoption of broadband.

First and foremost, My ConnectView allows consumers to locate their residence and identify providers that offer broadband Internet service to that location. The interactive platform allows for users to build and evaluate broadband expansion scenarios using a wealth of data, including several coverage analysis layers, speed analyses, Community Anchor Institutions, and tools to search and export household demographic information, as well as extract data in GIS, spreadsheet, and/or PDF formats.

My ConnectView also features more interactive data layers and additional tools than ever before to allow the consumer to explore the broadband data. My ConnectView provides consumers with the ability to print, e-mail, and provide feedback on the broadband data displayed on the interactive map. Through the collection of this feedback, a visual demand for broadband is presented. This visualization allows the CN state programs the ability to validate the broadband availability for accuracy. If residents within a region state they are without broadband, but the interactive map shows otherwise, this allows CN to approach the providers within that area in an effort to trim down their coverage to more accurately represent real-world availability on the ground.

The Connect Ohio project launched My ConnectView on April 2, 2012, and has received 2,091 visits this reporting period; to date the interactive mapping application has received 15,284 visits.

Speed Test Methodology

The 2,248 speed tests that are represented in the Connect Ohio Speed Test Report during this reporting period (15,453 grant inception to date) are the result of a partnership between CN and Ookla Net Metrics. Utilizing this relationship increases the level of confidence in the data being collected and provides for a far greater sample size than could be collected by a single testing site.

Ookla owns and operates Speedtest.net, as well as develops and deploys speed tests, such as the Connect Ohio speed test website, for partners around the world. This network of sites that is developed and run on its testing technology provides Ookla with a vast dataset that, due to the variability of geographic information collected across the varying speed test sites, is geocoded utilizing Geo-IP technology. This technology allows for tests to be geocoded to points of aggregation, typically larger nodes across provider networks. While there are hundreds of thousands of tests that have been conducted, the level of aggregation is only sufficient for county-level detail due to the test results being located at these larger nodes and not at an absolute location for each speed test.

In an effort to validate broadband data from the Connect Ohio project, speed test information is collected throughout the state. Speed tests provide speed information on the path taken through all networks (a provider's network as well as additional networks) a local machine must connect to in order to reach the host test. The benefit of this collection of speed information is two-tiered. First, it allows for a comprehensive dataset of speeds, while also providing Connect Ohio with the information on where broadband services are available. Second, unlike theoretical speed information which may be received through the data collection process, the use of speed tests provide real-world information on the speeds that currently exist within the state of Ohio.

Providers Deemed Non-Viable

The following list of companies represents the remainder of the broadband provider universe that was originally identified as complete for outreach to begin for the State Broadband Initiative. These providers are not included in the Data Package for the April 2013 submission because they have been deemed non-eligible under the parameters and guidance of the SBI grant program. This list of companies includes, but is not limited to: providers offering service but below the current definition of broadband, those that have gone out of business, technology consulting firms, infrastructure or network construction companies, non-facilities based general resellers, etc.

	Company Name	URL	Comments
1	21Globe, Inc.	www.21globe.com/is/access/	General reseller of DSL and backhaul.
2	650Net	www.650net.net/	Dial-up only.
3	A 007 Access	www.a007.com/	General reseller of Quest DSL and mobile wireless; DSL does not qualify as the max advertised speed is 768 kbps x 128 kbps.
4	AAA Internet Service	n/a	URL no longer in service.
5	Aaccess Network Communications	www.aaccess.net/	Not a broadband provider; installs and maintains WiFi systems.
6	ACC-NET	www.acc-net.com/	This company is no longer an active provider or in business.
7	ACERX.NET	http://acerx.net/	General reseller but no contact information listed on website; requests for information were never returned.

8	Adelphia	n/a	No longer in business; assets liquidated.
9	Airespring, Inc.	www.airespring.com	General reseller of VOIP, long distance and data circuits (non-residential).
10	Airewaves Broadband, LLC	www.airewaves.com	URL no longer in service.
11	Airmail247.com	www.airmail247.com	Business mailing list search site; not a broadband provider.
12	Alphalink Technologies	www.alink.com/index.htm	This company is a nonfacilities-based reseller.
13	American Broadband & Telecommunications	www.ambt.net	This company is a nonfacilities-based reseller.
14	Antioch Wireless Broadband	www.antiochwirelessbroadband.com/	Resells DSL and cellular service in Antioch, IL only.
15	Arrowheadnet.com	www.arrowheadnet.com/	Domain registration and web hosting company.
16	bargainisp.net	www.bargainisp.net/	Generic web directory site; company does not offer broadband.
17	Beonline	www.beol.net	This company is a nonfacilities-based reseller.
18	Bonzai Pipeline, Inc.	www.bonzaipipeline.net	This company is no longer in business.
19	BreezeWave Broadband	www.breezewave.com	This company is no longer in business.
20	Bright Choice	www.brightchoice.com	Bright Choice was acquired by Omnicity.
21	Broadband National	www.broadbandnational.com	Nonfacilities-based general reseller of DSL and satellite for 36 companies (e.g., ACC Business, HughesNet, et al.).
22	Broadview Networks Holdings, Inc.	www.broadviewnet.com	Wholesale reseller of partners' communication products and services; company is nonfacilities-based.

23	BullsEye Telecom, Inc.	www.bullseyetelecom.com	Integrated suite of telecommunications services for businesses and general reseller of backhaul.
24	Byesville.Net	www.byesville.net	This company is no longer in business.
25	Cable One	n/a	Inactive; non-state provider.
26	CAC MediaNet, Inc.	n/a	No longer in business; acquired by First Step (Michigan general reseller of DSL).
27	Camino-Net Internet Services	www.camino-net.com	No longer in business; was dial-up only.
28	CanNet Internet Services	www.cannet.com	Offers dial-up and B2B services, webhosting, etc.
29	Canton Cable	n/a	Acquired by Comcast.
30	CCIS.net	www.ccis.net	Now owned by Beacon Technologies; offers dial-up and is general reseller of DSL in Pennsylvania.
31	Celito Communications	www.celito.net/	Offers dial-up and wireless in North Carolina.
32	CIMCO Communications, Inc.	www.cimco.net	This company is a nonfacilities-based reseller.
33	Clear Sky Communications	www.clearskycommunications.com/	This company is a general reseller of and an installation company for satellite services.
34	Cleartouch.Com	n/a	This company is no longer in business.
35	CloverNet	n/a	Script coding application company.
36	Coax-Net	www.coax.net	This company is a nonfacilities-based reseller.
37	Cobridge Communications, LLC	www.cobridge.net/communications	This company was acquired in Ohio by Time Warner.

38	Cognisurf	www.calling-plans.com	Dial-up internet provider.
39	Columbus Cable	n/a	Possibly acquired by Comcast; OSS service branch.
40	Combined Technologies Inc.	www.ctipack.com	This company is no longer in business.
41	Communication Options Inc.	www.coi.net	Provides B2B and residential dial-up.
42	config.com Internet	www.config.com	Nonfacilities-based reseller; provided limited data but not enough for creation of coverage area or identification of services.
43	CoreComm Wireless	n/a	This company is no longer in business.
44	Dacor Internet Services	www.dacor.net/	This company is a nonfacilities-based reseller.
45	Data-Tel of Illinois, Inc.	www.data-telinc.net/	This company is a nonfacilities-based reseller.
46	Davis Voice and Data	n/a	Cellular reseller only; does not operate a broadband network.
47	Dayton Digital Networks	www.daytondigital.net	No longer offers broadband services.
48	Deltaforce	www.deltaforce.net	Dial-up and webhosting services only.
49	deluxehost.com	deluxe-host.com	Offers web hosting only.
50	Devlin Express	www.devlinex.com	This company is a nonfacilities-based reseller.
51	DGUI	www.dgui.com/	No longer in business; domain name for sale.
52	DHB Networks, Ltd.	www.dhbnetworks.com	This company is no longer in business.
53	Dial National	www.dialnational.com/	Inactive URL; out of business.

54	Dialer.net	www.dialer.net/internet_access/United_States.html	Offers international dial-up services.
55	DigitalBridge Communications Corp.	n/a	Non-state provider; serves Idaho, Indiana, Montana, South Dakota, Virginia, and Wyoming.
56	DSL @ Interlync	www.interlync.com	General reseller of Covad and for this mapping cycle they have been non-responsive.
57	DTS-NET.COM	www.dts-net.com/	Provider of wholesale and retail telecommunications services.
58	DuplexCom of Ohio, LLC	http://www.dcowireless.com	This company is no longer in business.
59	Duvall Wireless	www.duvallwireless.net	This company is no longer in business.
60	East Allen High Speed Internet, LLC	n/a	Non-state provider; serves Allen County, Indiana.
61	East Palestine Internet, Inc.	www.epiinternet.com/	Company appears to have gone out of business; phone is disconnected and Inactive URL.
62	Enventis Telecom Inc.	n/a	Non-state general reseller.
63	Erielink LLC	www.erielink.com	No longer in business.
64	ETI - Connecting Your World	www.cyberenet.net/	General reseller of DSL services from infrastructure owned by Verizon, AT&T, and Covad.
65	EZnet Ohio	www.2.ezo.net/iserv.htm	Provides dial-up service.
66	FairPoint Broadband	www.fairpoint.com	Non-state provider.
67	Fast Dependable Access	www.fda.net	Inactive URL; company appears to have gone out of business.

68	g wireless, Inc.	http://www.g-wireless.net	Acquired by another company.
69	Galaxywave Internet	www.galaxywave.net/	Phone number was disconnected.
70	Global Crossing Telecommunications, Inc.	n/a	Acquired by another company.
71	GO Concepts	n/a	This company is a nonfacilities-based reseller.
72	Great American Broadband, Inc.	www.oibw.net	Non-state provider; serves Indiana.
73	Hubwest Protected Networks LLC	www.hubwest.com	Dial-up and web hosting only.
74	iDigi Wireless	www.digi.com	Inactive URL; no longer in business.
75	Imbris, Inc.	www.imbris.com	Provides fixed wireless in Idaho only.
76	IMGISP.NET	www.imgisp.net/	Search engine.
77	Incredible Networks	n/a	Inactive URL; out of business.
78	Inercom Communications Inc.	www.inercom.com	Inactive URL; out of business.
79	Interactiveinfo.com Inc.	www.rocketbroadband.com	Offers cable television services in NY only.
80	In-Touch Software	www.intouchsoftware.co.uk	Software development company.
81	iRadical	n/a	Inactive URL; out of business.
82	ISPartner.net	n/a	Inactive URL; out of business.
83	KAS Cable TV	www.kascable.com	This company is a nonfacilities-based reseller.
84	KeyOn Communications, Inc.	www.keyon.com	This company was acquired by New Knoxville Telephone Company.

85	LARIAT.NET	www.lariat.net/	Offers fixed wireless services in Wyoming only.
86	LCSisp.com	www.lcsisp.com/index.cfm	Offers national dial-up services only.
87	Lek.net Internet Services, Inc.	www.lek.net	General reseller of AT&T DLS and offers dial-up and computer repair.
88	LightEdge Solutions, Inc.	www.lightedge.com	IT consulting; LightEdge does not provide residential service in any state.
89	Lightyear Network Solutions, LLC	www.lightyear.net	Nonfacilities-based general reseller.
90	LinkAmerica.Net	www.linkamerica.net/	Inactive URL; out of business.
91	Linked Communications	http://www.linked-llc.com/	Acquired by Reliable Wireless Solutions.
92	Magnum Cable	n/a	Inactive URL; out of business.
93	MainBoard	www.mainboard.cc/internet.htm	General reseller in Virginia.
94	Maine Cable and Wireless	www.mainecableandwireless.com	Inactive URL; out of business.
95	Marcin Company	n/a	Inactive URL; out of business.
96	Metropolitan Telecommunications Holding Company	n/a	MetTel provides facilities-based and resold services (certified CLEC in some states); the company provides a variety of voice, including wireless, and data services to commercial customers.
97	Millenicom Inc.	www.millenicom.com	General reseller of dial-up and mobile broadband (Sprint network).
98	Nanomega.Com	www.nanomega.com	Inactive URL; out of business.

99	NCO Wireless	www.ncowifi.com	Acquired by NexGen Access.
100	NetAccess, Inc.	www.nas.net/	Offers wireless B2B services only.
101	NetSpeed Online	www.netspeed-online.net	Inactive URL; out of business.
102	New Edge Network, Inc.	www.newedgenetworks.com	Acquired by EarthLink.
103	Northwest ISP	www.northwestisp.com/	Inactive URL; out of business.
104	nTelos, Inc.	n/a	Non-state provider; offers mobile wireless cards in West Virginia.
105	NuVox, Inc.	www.nuvox.com	Acquired by Windstream.
106	OffWorld1	n/a	Inactive URL; no longer in business.
107	Omnicity	www.omnicity.net	Acquired by Broadband Networks Co.
108	ONEcom Wireless	n/a	Inactive URL; no longer in business.
109	Open Range Communications, Inc.	http://www.openrangecomm.com/	No longer in business.
110	Overarch Broadband	n/a	Offers services in Idaho only.
111	Pacific Internet Exchange	www.pie.us/	Inactive URL; company appears to have gone out of business.
112	PAETEC Communications, Inc.	http://www.paetec.com/	Acquired by another company.
113	Paknet Limited	n/a	Subsidiary of Pakistan Telephone Company; no services offered in the U.S.
114	Pattersonville Telephone Company	n/a	Does not offer broadband service.

115	Planet Online	www.planetonline.net/	Offers website hosting services.
116	Practical Support, Ltd.	http://www.practicalsupport.com/	Offers service, but below broadband threshold.
117	PremoWeb	www.premoweb.com/about_us/contact_us.html	Offers national dial-up services only.
118	Reliance Globalcom Services, Inc.	www.relianceglobalcom.com	California-based company; non-state provider.
119	Renaissance Networks	www.renaissancenetworks.com/	IT support company based in New Mexico.
120	Simply Dialup A Metrogeek Company	www.simplydialup.com/	Offers dial-up only.
121	Siscom Internet Service	www.siscom.net/index.html	This company is a nonfacilities-based reseller.
122	SkyLAN	n/a	This company is not a broadband provider.
123	Skymax Broadband, Inc.	http://www.skymaxbroadband.com/	No longer in business.
124	Sling Broadband	n/a	Non-state provider; WISP in Florida.
125	Solavei, LLC	http://www.solavei.com/	General reseller.
126	Supernova Systems, Inc.	home.onlyinternet.net/	Company acquired by Great American Broadband.
127	Surferz.Net	www.surferz.net/	Offers dial-up in upstate NY only.
128	T1 Shopper	www.t1shopper.com/	Search engine for general reseller.
129	TelNet Worldwide, Inc.	n/a	Does not offer broadband service.
130	The Iserv Company, LLC	www.iserv.net	This company is a nonfacilities-based reseller.
131	The T1 Company	www.t1company.com	Offers B2B services.

132	Total Access Networks, Inc.	n/a	Does not offer broadband service.
133	TSISP.NET	www.tsisp.net	Inactive URL; out of business.
134	U.S. Wireless Online, Inc.	n/a	Non-state provider; acquired by Caviair and offers service in Florida only.
135	University Corporation for Advanced Internet Development	n/a	Currently ineligible under the parameters and guidance of the SBI grant program.
136	Untangled Technology, LLC	n/a	Company Acquired by Lightspeed Technologies.
137	UNUM Telecommunications, Inc.	www.utinet.net/	Inactive URL; out of business.
138	WCNet	www.wcnet.org/rates/hispeed/	This company is a nonfacilities-based reseller.
139	Wcoil	www.wcoil.com	Despite numerous outreach efforts, this company remains nonresponsive; accordingly, we are uncertain of the types of services offered.
140	WilTel Communications, LLC	www.level3.com	Acquired by Level 3.
141	WireFire Internet	www.wirefire.com	Acquired by FiberNet.
142	Wireless Intranet	http://www.wirelessintra.net/	Inactive and no longer in business.
143	Wireless Roanoke, Inc.	www.wirelessroanoke.com/	Inactive URL; out of business.
144	wisbin	www.wisbin.com/	No longer in business.
145	www.AmericanAngel.us	www.americanangel.us/	Inactive URL; out of business.

146	YEYZOO.NET	www.yeyzoo.net/	Inactive URL; out of business.
147	YLISP (Your Local ISP)	www.itsyournet.com	Resells DSL and dial-up.
148	YourT1Wifi.com	yourt1wifi.com/	Offers wireless service in Idaho only.
149	Zito Media Communications, II, LLC	n/a	Zito Media does not yet offer broadband service in Ohio.
150	ZOOM Internet Services, LLC	n/a	Michigan-based dial-up provider and web hosting company.

APPENDIX A: ESTIMATION OF NON-PARTICIPATING PROVIDERS

Bellaire Television Cable Company

Giga-Data

BELLAIRE TELEVISION CABLE CO., INC.

As part of its ongoing broadband mapping efforts, Connected Nation (CN) has developed a series of processes with the goal of submitting mapping data to NTIA for every known and qualifying broadband provider, regardless of whether the provider has chosen to support and participate in the State Broadband Initiative (SBI) mapping program.

The following narrative provides detail regarding the recent data collection activities related to Bellaire Television Cable Co., Inc. (Bellaire), a hard-wire cable modem Internet service provider located in Bellaire, Ohio, with its service area in east-central Belmont County in eastern Ohio. This narrative will include information regarding how and where CN obtained publicly available data, and the on-the-ground data collection and infrastructure verification techniques that support the underlying data resulting in this broadband coverage estimate.

Background

CN staff members have attempted to obtain the participation of the provider with at least 30 recorded instances of communication via telephone and e-mail from March 3, 2010 through December 10, 2012.

The Issue

Connected Nation has been unable to obtain Bellaire's broadband coverage information through typical outreach efforts, and the provider continues to show reluctance to participate in the Connect Ohio broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN began building a file based on research information, enriching the file with information obtained through the public domain. As a first step, CN reviewed the provider's website (www.bellaire.bellaire.tv) to attempt to determine the residential service plans and the service area for the provider's broadband network. Unfortunately, the website is not used as an advertising tool, and the only mention of Bellaire's Internet service offering is in its Acceptable Use Policy: "Bellaire Cable TV provides a variety of Internet Services…to residences…" A telephone call to the customer service number revealed three Internet service packages ranging from $20 per month for a 2.5 Mbps downstream service to a maximum downstream speed tier of 4.5 Mbps for $40 per month.

A search for a Federal Registration Number (FRN) on the FCC **Co**mmission **Re**gistration **S**ystem (CORES) system yielded an FRN of 0003773074 **(Exhibit A)** with company contact information. Additionally, review of the Ohio Department of Commerce, Video Service Authorization (VSA Number: 2008-VSA-0044), which expires on January 14, 2019, identifies the service area as Pease Township (**Exhibit A2)**.

Exhibit A: Federal Registration Number

Registration Detail	
FRN:	0003773074
Registration Date:	09/14/2000 12:48:25 PM
Last Updated:	08/11/2006 01:27:00 PM
Business Name:	Bellaire Television Cable Co. Inc
Business Type:	Private Sector , Corporation
Contact Organization:	Bellaire Television Cable Co., Inc
Contact Position:	Richard A Nowak
Contact Name:	Mr Richard A Nowak
Contact Address:	509 Bellaire, OH 43906-0509 United States
Contact Email:	bcrp@1st.net
ContactPhone:	(740) 676-6377
ContactFax:	(740) 676-2582

Exhibit A2: Video Service Authorization

Ohio Department of Commerce
Video Service Authorization

Video Service Provider: Bellaire Television Cable Company, Inc.

VSA Number: 2008-VSA-0044
Application Date: November 14, 2008
VSA Effective Date: January 14, 2009
VSA Expiration Date: January 14, 2019

IS HEREBY GRANTED AN AUTHORIZATION TO PROVIDE VIDEO SERVICE IN THE VIDEO SERVICE AREA SPECIFIED BELOW IN ACCORDANCE WITH AND SUBJECT TO THE PROVISIONS OF 1332.21 THROUGH 1332.34 OF THE OHIO REVISED CODE AND THE TERMS AND CONDITIONS OF THIS AUTHORIZATION.

Bellaire Television Cable Company Service Areas
VSA Number: 2008-VSA-0044

Sub-Authorizations:

-07 Belmont
Pease Township

Preliminary Identification of Provider's Coverage Area

Utilizing on-line research and mapping information from the Connect Ohio website showing unserved cable broadband areas, as well as through a telephone call to the provider's customer service telephone number, a CN staff member was able to determine a possible office location and certain general boundaries for the service area. That preliminary information served as the basis for field research.

Field Testing Techniques

Having been told the extent of service along a certain road northwest of Bellaire, Ohio, a CN technician drove to the general location and determined the termination point of the cable line. It is important to note that this northern-most termination point is outside of the southern boundary of Pease Township, and no other evidence was found to support Pease Township as part of the provider's service area. Following the cable line along roadways and easements, the CN technician was able to trace the aerial plant back to one of two origination points (**Exhibit B**). A local resident confirmed that the tower structure belonged to the broadband provider, and served as the main office. However, the location was a private residence, and therefore the CN technician did not enter the property.

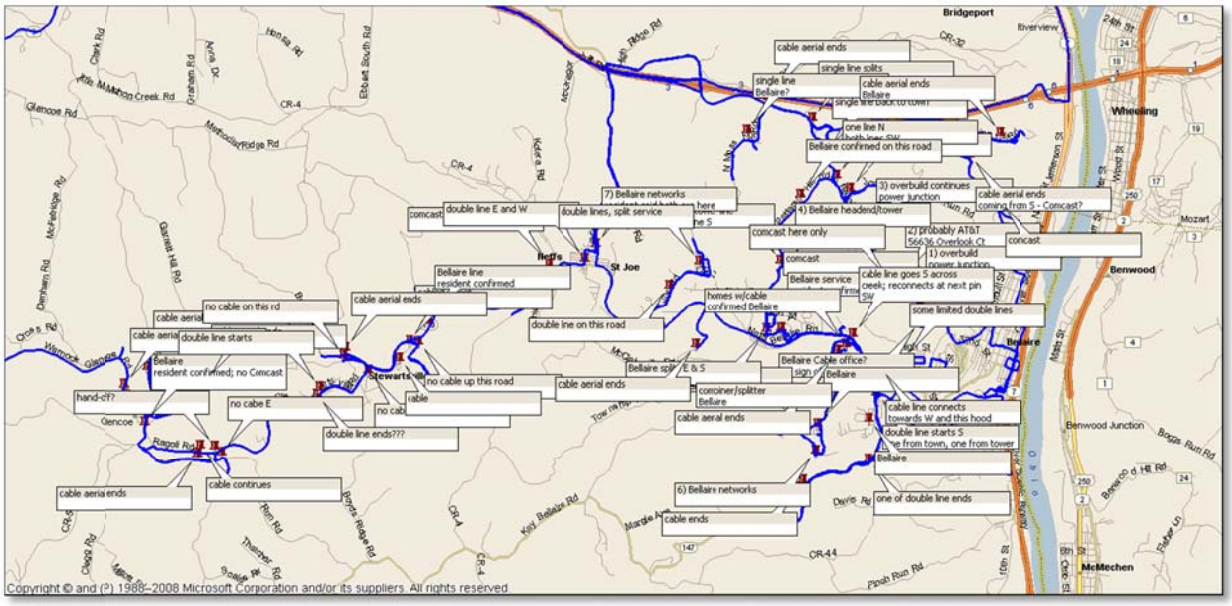
Exhibit B: Cable Head-End Location

Visual identification of the physical cable plant was straightforward as all cable lines were attached to utility poles above ground (**Exhibit C**). In some instances, more than one aerial cable line was present. Since only two cable providers are available in the area, such overbuild logically confirmed the presence of Bellaire (as well as the other provider).

Exhibit C: Aerial Cable Plant

By "driving the line," the technician was able to identify the most likely aerial pathways. Along the route, the technician noted line splits, junctions, overbuilds, amplifiers, power sources, terminations, and other confirming cable plant characteristics, and noted such items in Microsoft *Streets & Trips* tracking software (**Exhibit D**). In addition, the technician conducted random interviews of area residents to confirm the presence of Bellaire broadband service along the cable route.

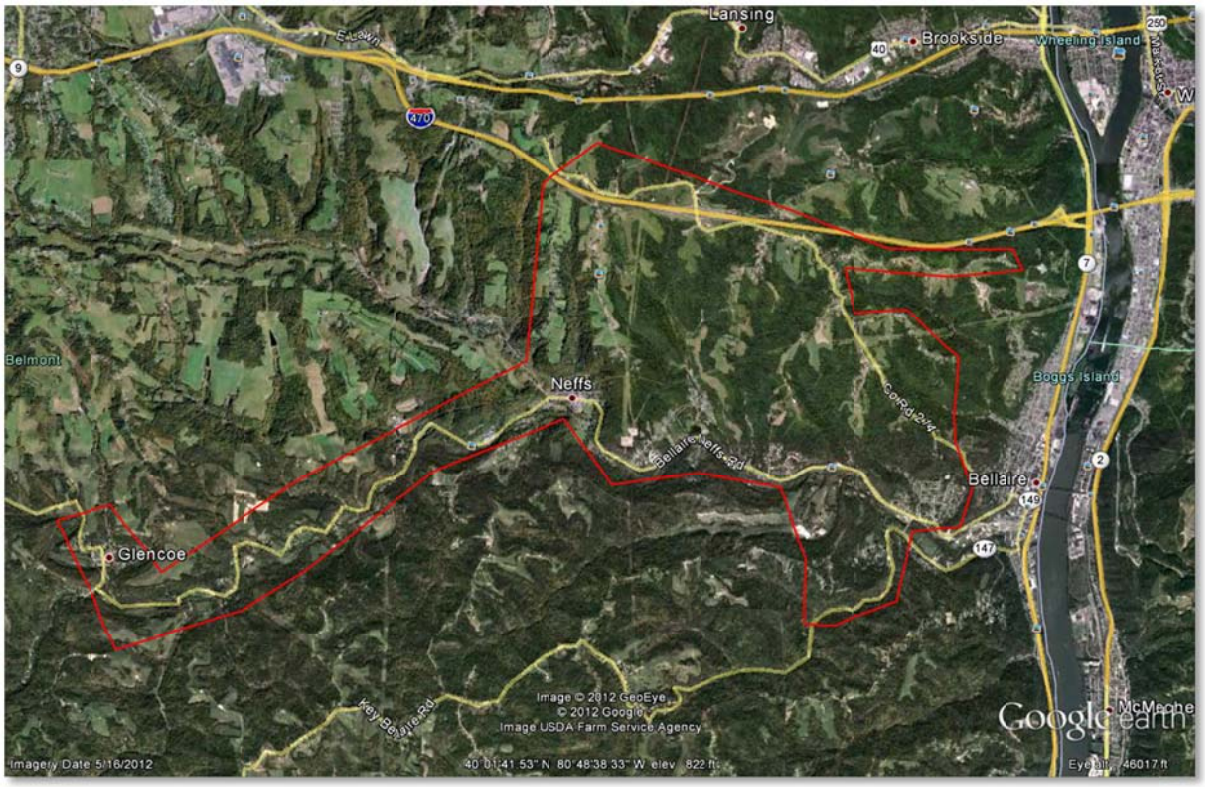
Exhibit D: Cable Line Tracking



Results and Submission for April 2013

As a result of the field validation and research, Connected Nation prepared the coverage-area polygon below, and on December 20, 2012, forwarded it to the provider for feedback. As of January 20, 2013, no response was received from the provider. Therefore, CN submits this estimate of Bellaire's broadband coverage area (**Exhibit E**).

Exhibit E: Bellaire Television Cable Co., Inc. Coverage Area Estimate



GIGA-DATA, LLC

As part of its ongoing broadband mapping efforts, Connected Nation (CN) has developed a series of processes with the goal of submitting mapping data to NTIA for every known and qualifying broadband provider, regardless of whether the provider has chosen to support and participate in the State Broadband Initiative mapping program.

The following narrative provides detail regarding the recent data collection activities related to Giga-Data, LLC, a wireless Internet service provider (WISP) doing business as Firewire in Cambridge, Ohio, with its service area in Guernsey County in east-central Ohio. This narrative will include information regarding how and where CN obtained publicly available data, and the on-the-ground field verification and validation techniques that support the resulting broadband coverage estimate.

Background

CN staff members have attempted to obtain the participation of the provider with at least 19 recorded instances of communication via telephone and e-mail from June 2, 2011, through December 31, 2012. During that period, two personal visits were also made to the provider's office in Cambridge.

The Issue

Connected Nation has been unable to obtain Giga-Data's broadband coverage information through typical outreach efforts, and the provider continues to show reluctance to participate in the Connect Ohio broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN began building a file based on research information and, as time progressed, enriched the file with information obtained through the public domain. As a first step, CN reviewed the provider's website (www.firewireinternet.com) to determine the residential service plans and the service area advertised for the provider's wireless network. Unfortunately, the website does not identify either residential plans or the service area. The only note about Internet speeds states: "we can offer very high bandwidth and speed through the service." A call to the office revealed a stated speed of around 1.5 Mbps downstream for a monthly price of $29.99.

Further on-line research determined that, as a self-proclaimed new business, the provider's wireless broadband service was only available from a single transmit point, and the only access point is located at the provider's office in Cambridge (**Exhibit A**). As confirmation, Firewire is listed in the Wireless ISP Association's directory as a WISP with a single service area centered in Cambridge.

Exhibit A: Office Transmission Location

A search for a Federal Registration Number (FRN) on the FCC **Co**mmission **Re**gistration **S**ystem (CORES) system yielded an FRN of 0016086019 (**Exhibit B**) with company contact information. The FRN was also referenced in the FCC Universal Licensing System (ULS) to identify any licenses the provider may hold, and none were found.

Exhibit B: Federal Registration Number

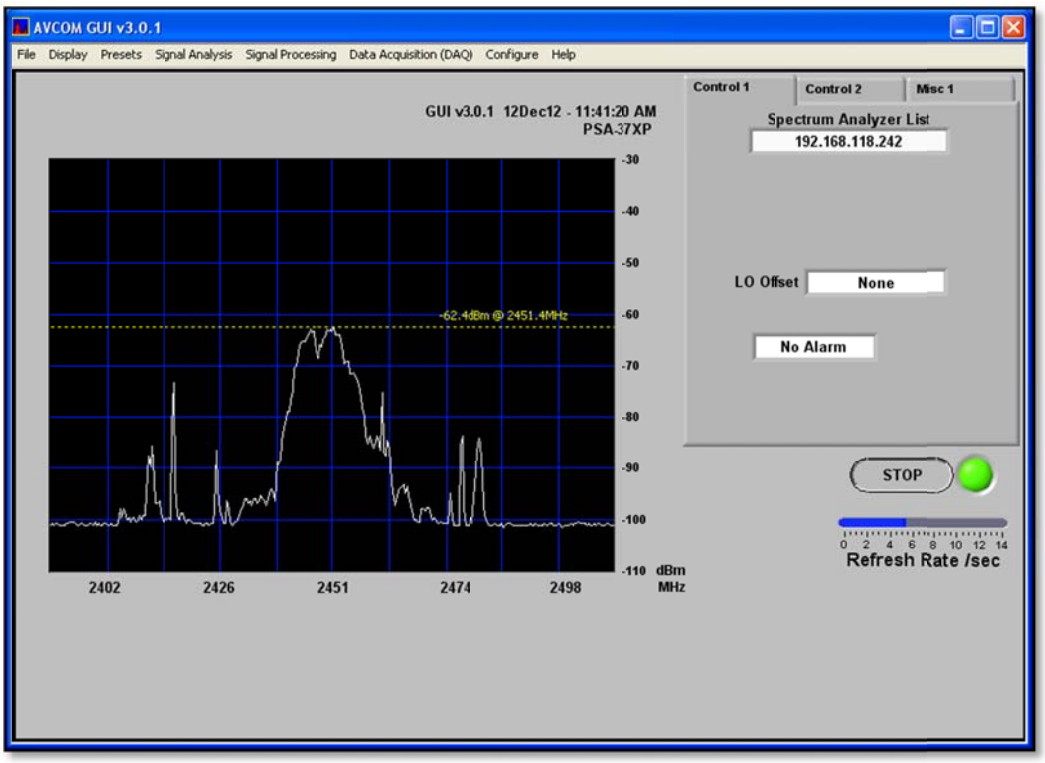
Registration Detail	
FRN:	0016086019
Registration Date:	02/09/2007 11:13:00 AM
Last Updated:	
Business Name:	Giga-Data
Business Type:	Private Sector , Limited Liability Corporation
Contact Organization:	
Contact Position:	President
Contact Name:	
Contact Address:	101 1/2 Highland Ave. Cambridge, OH 43725 United States
Contact Email:	noc@firewireinternet.com
ContactPhone:	(740) 432-3130
ContactFax:	

Field Testing Techniques

Having identified that the only transmit location was at the provider's office, a CN technician visited the office and performed a signal test for the detection of active wireless frequencies typically utilized to provide WISP service. The CN technician was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands. At the test location, the CN technician attempted to be isolated from Wi-Fi networks in the test area, facilitated spectrum

readings from the AVCOM analyzer, and captured the results of the frequency tests as validation data for wireless tower transmissions (**Exhibit C**).

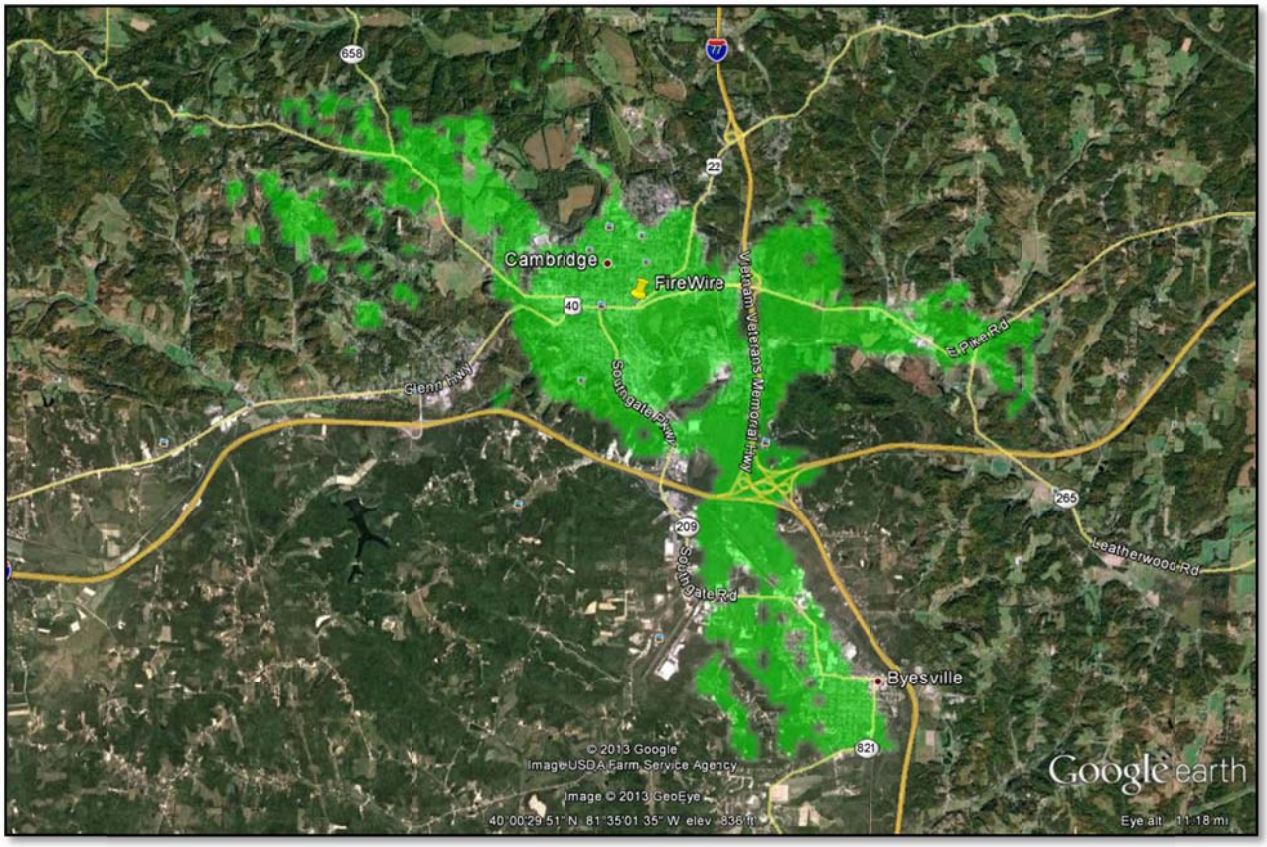
Exhibit C: Signal Test Results



Signal Propagation Maps

In order to prepare a propagation map for the central transmitter, the CN technician identified the antenna height, verified the GPS coordinates, and recorded this and other information. With the objective of reasonably representing the provider's practical service area, CN staff prepared a propagation map (**Exhibit D**) based on that information.

Exhibit D: Propagation Map for the Cambridge, OH Office Location



Results and Submission for April 2013

Testing at the office location determined that wireless signal was available for broadband service. The propagation analysis above was completed and forwarded to the provider for review and feedback prior to CN's including the coverage area in the Ohio Broadband Map's April 2013 iteration; however, no response was received as of March 1, 2013.

APPENDIX B: BROADBAND PROVIDER LOG

Broadband Provider Log

Complete	172
Non-Responsive/Refused	4
In Progress	3
Reseller Providing Data	0
Count of Datasets by Status	**179**
Total Unique Providers Represented	**127**

Provider Name	Platform	Status	NDA Execution Date	Notes
Advanced Computer Connections	Fixed Wireless	Data Added to Statewide Inventory	10/15/2012	[NOV-19-12 Amanda Bentley] Correction: Provider was previously non-responsive; submitting data for the first time.
Amplex Internet	Fixed Wireless	Data Added to Statewide Inventory	3/26/2010	[MAR-04-13 Amanda Bentley] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset created for April 2013 submission.
AT&T Inc.	DSL	Data Added to Statewide Inventory	12/16/2009	[FEB-12-13 Amanda Bentley] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
AT&T Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/16/2009	[FEB-11-13 Amanda Bentley] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Bascom Mutual Telephone Company	Fiber	Data Added to Statewide Inventory	3/22/2010	[FEB-13-13 Amanda Bentley] Change: Provider expanded service area and converted entire cable network over to FTTH.
CenturyLink	DSL	Data Added to Statewide Inventory	12/4/2009	[FEB-22-13 Amanda Bentley] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Cincinnati Bell Telephone Company LLC	DSL	Data Added to Statewide Inventory	3/16/2010	[FEB-18-13 Amanda Bentley] Change: Provider expanded service area.
Cincinnati Bell Telephone Company LLC	Fiber	Data Added to Statewide Inventory	3/16/2010	[FEB-18-13 Amanda Bentley] Change: Provider expanded service area.
Comcast Cable Communications, LLC	Cable	Data Added to Statewide Inventory	12/7/2009	[FEB-11-13 Amanda Bentley] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Country Connections LLC	Fixed Wireless	Data Added to Statewide Inventory	2/15/2010	[FEB-28-13 Amanda Bentley] Correction: Extent of provider coverage scaled back in some areas.
CoxCom Inc.	Cable	Data Added to Statewide Inventory	1/29/2010	[FEB-13-13 Amanda Bentley] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
CUE Band	Fixed Wireless	Data Added to Statewide Inventory		[NOV-19-12 Amanda Bentley] Correction: Submitting data for the first time, but service was offered previously.
Fort Jennings Telephone Company	DSL	Data Added to Statewide Inventory	4/2/2010	[FEB-13-13 Amanda Bentley] Change: Provider changed part of DSL network to FTTH.
Fort Jennings Telephone Company	Fiber	Data Added to Statewide Inventory	4/2/2010	[FEB-13-13 Amanda Bentley] Change: Provider upgraded part of DSL network to FTTH.
Frontier Communications Corporation	DSL	Data Added to Statewide Inventory	1/22/2010	[FEB-27-13 Amanda Bentley] Change: Provider added DSLAMs and expanded service area.
Hocking Internet Technologies, Ltd	Fixed Wireless	Data Added to Statewide Inventory	8/12/2010	[MAR-04-13 Amanda Bentley] Correction: Provider was previously non-responsive; submitting data for the first time.
Horizon Telcom, Inc.	DSL	Data Added to Statewide Inventory	3/27/2010	[FEB-26-13 Amanda Bentley] Change: Provider expanded service area.
JB-Nets, LLC	Fixed Wireless	Data Added to Statewide Inventory	4/5/2010	[MAR-04-13 Amanda Bentley] Change: Provider expanded coverage area by adding additional towers.
Leap Wireless International, Inc.	Mobile Wireless	Data Added to Statewide Inventory	4/6/2010	[FEB-11-13 Amanda Bentley] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Massillon Cable TV, Inc.	Cable	Data Added to Statewide Inventory	2/9/2010	[FEB-18-13 Amanda Bentley] Change: Provider expanded service area.
Mediacom Indiana LLC	Cable	Data Added to Statewide Inventory	1/12/2010	[FEB-13-13 Amanda Bentley] Change: Provider expanded service area and increased speeds to tier 8 download/tier 5 upload.
MegaPath Corporation	DSL	Data Added to Statewide Inventory	2/15/2010	[FEB-18-13 Amanda Bentley] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.

MetaLINK Technologies, Inc.	Fixed Wireless	Data Added to Statewide Inventory	3/22/2010	[MAR-04-13 Amanda Bentley] Change: Provider added additional towers and removed others.
Mobilcomm	Fixed Wireless	Data Added to Statewide Inventory	2/16/2012	[MAR-04-13 Amanda Bentley] Change: Provider added additional towers expanding coverage area.
Nelsonville TV Cable, Inc.	Cable	Data Added to Statewide Inventory	4/7/2010	[FEB-06-13 Amanda Bentley] Change and Correction: Provider upgraded part of service area to FTTH; provider also edited coverage in removing some areas while expanding others.
Nelsonville TV Cable, Inc.	Fiber	Data Added to Statewide Inventory	4/7/2010	[FEB-06-13 Amanda Bentley] Change: Provider submitted data for new platform (FTTH).
NexGenAccess Inc.	Fixed Wireless	Data Added to Statewide Inventory	4/16/2010	[MAR-04-13 Amanda Bentley] Change: Provider added towers and extended service area.
Skycasters	Satellite	Data Added to Statewide Inventory	10/16/2012	[NOV-19-12 Amanda Bentley] Correction: Submitting data for the first time, but service was offered previously.
Southern Ohio Communication Services, Inc.	Fixed Wireless	Data Added to Statewide Inventory	4/20/2010	[FEB-13-13 Amanda Bentley] Change and Correction: Service expanded and revision to previous dataset.
Sprint Nextel Corporation	Mobile Wireless	Data Added to Statewide Inventory	1/14/2010	[FEB-11-13 Amanda Bentley] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
T-Mobile USA, Inc.	Mobile Wireless	Data Added to Statewide Inventory	1/8/2010	[FEB-21-13 Amanda Bentley] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
TDS Telecommunications Corporation	DSL	Data Added to Statewide Inventory	1/27/2010	[FEB-12-13 Amanda Bentley] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Time Warner Cable Inc.	Cable	Data Added to Statewide Inventory	12/21/2009	[FEB-19-13 Amanda Bentley] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission. Also, provider name has changed to Time Warner Cable Inc. and FRN# to 0007556251.
Verizon Communications, Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/14/2009	[FEB-11-13 Amanda Bentley] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Wabash Mutual Telephone Company	Fiber	Data Added to Statewide Inventory	3/30/2010	[FEB-11-13 Amanda Bentley] Change: Provider expanded service area and increased to speed tier 9.
Woodsfield Municipal Cable	Cable	Data Added to Statewide Inventory		[FEB-27-13 Amanda Bentley] Correction: Provider submitting data for the first time.
Com Net, Inc.	Backhaul	Backhaul Provider Only Processing Complete		
Level 3 Communications, LLC	Backhaul	Backhaul Provider Only Processing Complete	12/14/2009	
MegaPath Corporation	Backhaul	Backhaul Provider Only Processing Complete	2/15/2010	
T-Mobile USA, Inc.	Backhaul	Backhaul Provider Only Processing Complete	1/8/2010	
Ayersville Telephone Company	DSL	Speed Only Update; Data Processing Complete	3/22/2010	[MAR-05-13 Amanda Bentley] Change: Provider upgraded speed tiers from 5/2 to 7/3.
FairPoint Communications	DSL	Speed Only Update; Data Processing Complete	12/22/2009	[MAR-05-13 Amanda Bentley] Change: Provider has upgraded all exchanges to speed tiers 7/3.
Hughes Network Systems, LLC	Satellite	Speed Only Update; Data Processing Complete	2/5/2010	[MAR-06-13 Amanda Bentley] Change: Speed tiers increased from 5/2 to 7/4.
Nova Telephone Company	DSL	Speed Only Update; Data Processing Complete	4/5/2010	[MAR-05-13 Amanda Bentley] Change: Provider upgraded from speed tiers 4/2 to speed tiers 7/4.
Windstream Communications	DSL	Speed Only Update; Data Processing Complete	1/28/2010	[FEB-26-13 Amanda Bentley] Correction: Provider updated speed information.
GLW Broadband	Cable	No Update-Estimated Coverage Submitted for Non-Participating Provider		
Bellaire Television Cable Co. Inc.	Cable	Estimated Coverage Submitted for Non-Participating Provider		[MAR-01-13 Amanda Bentley] Correction: Estimated coverage created and submitted for non-participating provider.
Firewire Internet	Fixed Wireless	Estimated Coverage Submitted for Non-Participating Provider		[MAR-01-13 Amanda Bentley] Correction: Estimated coverage created and submitted for non-participating provider.
5G Mesh	Fixed Wireless	Approval for Update Not Received – Data Still Submitted		[MAR-01-13 Amanda Bentley] Correction: Provider submitting data for the first time.
1 Touch Technology Solutions, LLC	Fixed Wireless	No Update to Provide		
Armstrong Utilities, Inc.	Cable	No Update to Provide	3/11/2010	
Arthur Mutual Telephone Company	DSL	No Update to Provide	12/22/2009	
AT&T Inc.	Backhaul	No Update to Provide	12/16/2009	
Bascom Mutual Telephone Company	Backhaul	No Update to Provide	3/22/2010	
Bascom Mutual Telephone Company	Fixed Wireless	No Update to Provide	3/22/2010	
Block Communications, Inc.	Cable	No Update to Provide	2/8/2010	
Blu Sky Wireless	Fixed Wireless	No Update to Provide	2/24/2010	
Bryan Municipal Utilities	Cable	No Update to Provide		
Bryan Municipal Utilities	Fiber	No Update to Provide		
Buckland Telephone Co.	Fiber	No Update to Provide	4/10/2010	
Cable Co-op, Inc.	Cable	No Update to Provide	4/9/2010	
CenturyLink	Backhaul	No Update to Provide	12/4/2009	

CenturyLink	Backhaul	No Update to Provide	12/4/2009	
Cequel Communications	Cable	No Update to Provide	12/15/2009	
Champaign Telephone Company	DSL	No Update to Provide		
Champaign Telephone Company	Fiber	No Update to Provide		
Champaign Telephone Company	Fixed Wireless	No Update to Provide		
Cincinnati Bell Telephone Company LLC	Cable	No Update to Provide	3/16/2010	
Cincinnati Bell Telephone Company LLC	Mobile Wireless	No Update to Provide	3/16/2010	
Cincinnati Communications, LLC	Backhaul	No Update to Provide	1/6/2011	
Cincinnati Communications, LLC	BPL	No Update to Provide	1/6/2011	
Cincinnati Communications, LLC	Fiber	No Update to Provide	1/6/2011	
City of Wadsworth	Cable	No Update to Provide	7/19/2010	
Citynet, LLC	Backhaul	No Update to Provide	4/5/2010	
Clearwire Corporation	Fixed Wireless	No Update to Provide	3/3/2010	
Clearwire Corporation	Mobile Wireless	No Update to Provide	3/3/2010	
Conneaut Telephone Company	Cable	No Update to Provide	12/22/2009	
Conneaut Telephone Company	DSL	No Update to Provide	12/22/2009	
CoxCom Inc.	Backhaul	No Update to Provide	1/29/2010	
Coyote Wireless Broadband LLC	Fixed Wireless	No Update to Provide	4/19/2010	
DataBit Solutions Corp	Fixed Wireless	No Update to Provide		
Doylestown Telephone Company	Cable	No Update to Provide	4/14/2010	
Doylestown Telephone Company	DSL	No Update to Provide	4/14/2010	
Doylestown Telephone Company	Fiber	No Update to Provide	4/14/2010	
Erie County Cablevision, Inc.	Cable	No Update to Provide	2/8/2010	
FairPoint Communications	Cable	No Update to Provide	12/22/2009	
Frontier Communications Corporation	Backhaul	No Update to Provide	1/22/2010	
Gateway Telecom LLC	Fixed Wireless	No Update to Provide	3/22/2010	
Glandorf Telephone Company, Inc.	Cable	No Update to Provide	3/9/2010	
Glandorf Telephone Company, Inc.	DSL	No Update to Provide	3/9/2010	
GMN Wireless Broadband	Fixed Wireless	No Update to Provide	3/15/2010	
Hometown Cable Company	Fiber	No Update to Provide	4/15/2010	
Hometown Cable Company	Fixed Wireless	No Update to Provide	4/15/2010	
Horizon Telcom, Inc.	Fiber	No Update to Provide	3/27/2010	
Jefferson County Cable TV, Inc.	Cable	No Update to Provide	2/1/2010	
Kalida Telephone Company, Inc.	DSL	No Update to Provide	3/8/2010	
McClure Telephone Company	DSL	No Update to Provide	4/5/2010	
McClure Telephone Company	Fiber	No Update to Provide	4/5/2010	
Middle Point Home Telephone Company	DSL	No Update to Provide	1/19/2010	
Minford Telephone Company	DSL	No Update to Provide	3/3/2010	
New Era Broadband, LLC	Fixed Wireless	No Update to Provide	7/12/2010	
New Knoxville Telephone Company	Backhaul	No Update to Provide	3/12/2010	
New Knoxville Telephone Company	Cable	No Update to Provide	3/12/2010	
New Knoxville Telephone Company	DSL	No Update to Provide	3/12/2010	
New Knoxville Telephone Company	Fiber	No Update to Provide	3/12/2010	
New Knoxville Telephone Company	Fixed Wireless	No Update to Provide	3/12/2010	[MAR-26-13 Ashley Hitt] Change: Provider acquired KeyOn Communications, Inc.; KeyOn's service area is now being submitted under this provider's name.
North West Net, Inc.	Fixed Wireless	No Update to Provide	4/6/2010	
OneCommunity	Backhaul	No Update to Provide	4/14/2010	
OneCommunity	Fixed Wireless	No Update to Provide	4/14/2010	
Ottoville Mutual Telephone Company	Backhaul	No Update to Provide	12/22/2009	
Ottoville Mutual Telephone Company	DSL	No Update to Provide	12/22/2009	
Ottoville Mutual Telephone Company	Fiber	No Update to Provide	12/22/2009	
RAA Services	Fixed Wireless	No Update to Provide	3/12/2010	
Ridgeville Telephone Company	DSL	No Update to Provide	3/12/2010	
RTEC Communications, Inc.	Cable	No Update to Provide	4/13/2010	
RTEC Communications, Inc.	Fiber	No Update to Provide	4/13/2010	
Sherwood Mutual Telephone Association	DSL	No Update to Provide	3/25/2010	
Spacenet, Inc.	Satellite	No Update to Provide		
Sprint Nextel Corporation	Backhaul	No Update to Provide	1/14/2010	
Sycamore Telephone Company	Backhaul	No Update to Provide	12/22/2009	
Sycamore Telephone Company	DSL	No Update to Provide	12/22/2009	
TDS Telecommunications Corporation	Backhaul	No Update to Provide	1/27/2010	
Telephone Service Company	Cable	No Update to Provide	4/6/2010	
Telephone Service Company	DSL	No Update to Provide	4/6/2010	
Telephone Service Company	Fiber	No Update to Provide	4/6/2010	
The City of Dover	Backhaul	No Update to Provide	4/9/2010	
tw telecom of ohio, llc	Backhaul	No Update to Provide	4/21/2010	
UDATAnet	Fixed Wireless	No Update to Provide		
US Signal Company, LLC	Backhaul	No Update to Provide	6/17/2010	
Vaughnsville Telephone Company, Inc	DSL	No Update to Provide	12/22/2009	
Verizon Communications, Inc.	Backhaul	No Update to Provide	12/14/2009	
ViaSat, Inc.	Satellite	No Update to Provide	1/8/2010	
Wabash Mutual Telephone Company	DSL	No Update to Provide	3/30/2010	
Wabash Mutual Telephone Company	Fixed Wireless	No Update to Provide	3/30/2010	
Waldron Communication Company	Backhaul	No Update to Provide	3/19/2010	
Waldron Communication Company	Fixed Wireless	No Update to Provide	3/19/2010	
Wavelinc Communications	Fixed Wireless	No Update to Provide		
WideOpenWest Finance, LLC	Cable	No Update to Provide		
XO Communications, LLC	Backhaul	No Update to Provide	2/12/2010	
YES Learning and Computer Center Inc	Backhaul	No Update to Provide	4/24/2010	
Your Digital Partner	Fixed Wireless	No Update to Provide	6/28/2010	
Avolve, Inc.	Fixed Wireless	No Update Provided – Use Last Submission Data	2/17/2011	
Benton Ridge Telephone Company	Fixed Wireless	No Update Provided – Use Last Submission Data	4/13/2010	
Benton Ridge Telephone Company	DSL	No Update Provided – Use Last Submission Data	4/13/2010	

Broadband Networks	Fixed Wireless	No Update Provided – Use Last Submission Data		[DEC-10-12 Mark Messer] Change: Provider acquired Omnicity Inc.; service area of that provider is now being submitted with the Broadband Network coverage. http://www.insideindianabusiness.com/newsitem.asp?ID=56919
Cogent Communications, Inc.	Backhaul	No Update Provided – Use Last Submission Data		
ConnectLink, Inc.	Backhaul	No Update Provided – Use Last Submission Data	3/15/2010	
D&P Communications, Inc.	Fixed Wireless	No Update Provided – Use Last Submission Data		
Dark Horse Networks, LLC	Fixed Wireless	No Update Provided – Use Last Submission Data	3/15/2010	
Eagle Communications, LLC	Fixed Wireless	No Update Provided – Use Last Submission Data		
East Cleveland Cable TV and Communications, LLC	Cable	No Update Provided – Use Last Submission Data	4/13/2010	
Farmers Mutual Telephone Company	Fixed Wireless	No Update Provided – Use Last Submission Data	12/22/2009	
Farmers Mutual Telephone Company	DSL	No Update Provided – Use Last Submission Data	12/22/2009	
First Communications, LLC	Backhaul	No Update Provided – Use Last Submission Data	8/13/2012	
Freund Enterprises Inc.	Backhaul	No Update Provided – Use Last Submission Data	3/2/2010	
Freund Enterprises Inc.	Fixed Wireless	No Update Provided – Use Last Submission Data	3/2/2010	
Imagine Networks, LLC	Fixed Wireless	No Update Provided – Use Last Submission Data	7/13/2011	
Intelliwave, LLC	Fixed Wireless	No Update Provided – Use Last Submission Data		
Jenco Speed Web	Fixed Wireless	No Update Provided – Use Last Submission Data	4/28/2010	
King Office Service, Inc.	Fixed Wireless	No Update Provided – Use Last Submission Data	4/9/2010	
LightSpeed Technologies	Fixed Wireless	No Update Provided – Use Last Submission Data	2/9/2010	
Mango Bay Internet	Fixed Wireless	No Update Provided – Use Last Submission Data	2/23/2010	
Mechcom Dot Net	Fixed Wireless	No Update Provided – Use Last Submission Data	4/22/2010	
Mikulski Communications LLC	Fixed Wireless	No Update Provided – Use Last Submission Data	4/13/2010	
North Coast Wireless Communications	Fixed Wireless	No Update Provided – Use Last Submission Data	4/14/2010	
nTelos, Inc.	DSL	No Update Provided – Use Last Submission Data		
Redbird Internet Services	Fixed Wireless	No Update Provided – Use Last Submission Data	3/22/2010	
S. Bryer Cable TV Corp.	Cable	No Update Provided – Use Last Submission Data	11/8/2011	
SAA bright.net, Inc.	Fixed Wireless	No Update Provided – Use Last Submission Data	3/23/2010	
Slane Telecom	Fixed Wireless	No Update Provided – Use Last Submission Data	4/9/2010	
Wilkshire Communications, Inc.	Fixed Wireless	No Update Provided – Use Last Submission Data	3/16/2010	
Windstream Communications	Backhaul	No Update Provided – Use Last Submission Data	1/28/2010	
Zayo Group, LLC	Backhaul	No Update Provided – Use Last Submission Data		
Windstream Communications	Backhaul	Solicited Initial Data	1/28/2010	
Windstream Communications	DSL	Solicited Initial Data	1/28/2010	
Windstream Communications	DSL	Solicited Initial Data	1/28/2010	[MAR-11-13 Amanda Bentley] Correction: While it was assumed that this subsidiary's coverage was submitted under Windstream in October 2012, it was not, and information was requested of this subsidiary for April 2013.
FiberTower Corporation	Backhaul	Non-Responsive to Multiple Attempts		In addition to multiple contact attempts made during the last mapping submission period, 4 contact attempts were made this period.
New Albany Net	Fiber	Non-Responsive to Multiple Attempts		In addition to multiple contact attempts made during previous mapping submission periods, 3 contact attempts were made this period.
Reliable Wireless Solutions	Fixed Wireless	Non-Responsive to Multiple Attempts		4 contact attempts were made this period.
Reliance Globalcom Services, Inc.	Backhaul	Non-Responsive to Multiple Attempts		In addition to multiple contact attempts made during previous mapping submission periods, 5 contact attempts were made this period.

Oklahoma Broadband Mapping

Data Submission Methodology Report

April 1, 2013

1935 Jamboree Drive
Colorado Springs, CO 80920

Information Services Division Office of Management and Enterprise Services
3115 N. Lincoln Blvd.
Oklahoma City, OK 73105

Oklahoma Broadband Mapping

Data Submission Report (April 1, 2013)

Table of Contents

1 Introduction

This report is submitted along with the seventh data submission for the Oklahoma Broadband Mapping Project. This submission includes all data collected so far per the requirements of the National Telecommunications and Information Administration (NTIA) State Broadband Data and Development Grant Program (Docket No. 0660-ZA29) Notice of Funds Availability (NOFA) and formal and informal clarifications to it. Specifically, it includes broadband data collected from broadband providers and community anchor institutions data compiled from various sources for the State of OK. The State of OK has retained a mapping contractor, The Sanborn Map Company to perform the work related to the Mapping Grant for this project. Data from the previous submission is now publicly accessible via the OK Broadband Program (http://broadbandmapping.ok.gov/).

This document is a supplement to the six previous reports submitted with previous data submissions on May 1, 2010, October 1, 2010, April 1, 2011, October 1, 2011, April 1, 2012 and October 1, 2013 respectively. Therefore, it builds on the documents provided with those submissions. Rather than repeat the contents of the previous report, this document makes incremental updates on various topics where changes have been made in the methodology or reiterates the methodology used. Please refer to the previous documents for further details.

2 Overall Project Status

2.1 DATA COLLECTION

This section details data collection related to NTIA deliverables which include broadband data and community anchor institution data.

2.1.1 Broadband Data

For this submission, Sanborn started data collection efforts on January 3rd, 2013 by sending out data update requests and technical data specifications. These were sent to a large list of companies which were compiled from multiple lists (FCC 477 list (dated June 30, 2011), Wireless Internet Service Providers Association (WISPA)) and from any providers that were identified through other sources such as web research, planning meetings, State outreach, etc. Sanborn also uploaded the final data for each provider in NTIA format from the previous submission on the Sanborn Provider Portal. The providers were encouraged to use the provider portal and update their information on it.

We followed the same contact and follow-up protocols as the previous submissions. In brief, this involved following up with already participating providers after sending them a letter requesting data updates. For newly identified providers, we contacted them three additional times and offered any/all support to make this as easy as possible. We provided a due date for submission but worked with providers who needed more time. If providers did not submit updated data and did not respond to our efforts to contact them, we reused their existing data.

The following are some of the important changes or no changes:

1) We continued to request all providers to provide us their speed information in mbps rather than as a speed tier. We did this in order to better validate the data, analyze served/underserved, and identify the breakdowns in speeds within a given tier. However, we have found over the last few submissions; this has caused some confusion between what we are asking for (speeds in mbps) vs. typical speeds. Given that many providers are not providing this information, it is hard to use the data effectively for analysis and we may consider going back to the NTIA requirements in the next submission.

2) As in the previous submission, we also requested fixed wireless providers to provide us appropriate information to do propagation analysis. We had helped improve data for three providers this submission, added three new wireless providers and sourced data for them from various sources such as Link Technologies. For those WISP providers that provided us the data to accomplish propagation, we used Radio Mobile to do propagation

analysis and iterated with the providers until the parameters were suitably selected to get appropriate output. Propagation analysis results were provided to the providers for review through our provider portal and Google kmz file formats to ensure validation.

3) We continue to not collect data from resellers in the submission.

4) Due to our NDA restrictions, last mile infrastructure points, if submitted by providers, are not being submitted to NTIA. Likewise, address points are not included in this submission for any commercial provider.

5) We continue to submit data for satellites in this submission based on NTIA clarifications. In this submission, Hughes Net submitted an entirely new set of data during the validation stage. The data mapped out census blocks served by two different satellites, but there was no confirmation provided by Hughes about what to do with the gaps left over. We are submitting the data as is.

6) If a cable based wireline provider provides both DOCSIS 2.0 and DOCSIS 3.0 service to the same area, the block or road was listed only once with a technology code of 40.

7) Providers were only willing to indicate on a general level if they served business, residential or both - we did not get any providers that broke down the type of service by blocks or road segments. Only if the provider stated they only serve business to business customers did we fill in the "category of end user" with a code of 2, or if they told us specifically that they serve only residential, we used code 1. Those that did not confirm their end user codes, we calculated as a 5 unless we know from other sources that they needed to be something else. There are four providers in OK who are identified as serving business customers only. These are:

    a. Cogent Communications, Inc.
    b. Level 3 Communications, LLC
    c. TW Telecom of Oklahoma LLC
    d. XO Communications, LLC

8) This submission is being made based on the NTIA data model as of December 2012 provided by NTIA on the SBDD site.

9) Terrestrial Mobile Wireless and Terrestrial Fixed Wireless (licensed and unlicensed) were again treated as wireless coverage and were delivered as a shape. In cases where a provider served the same spectrum with different speeds, overlapping areas were removed and the higher speed was assigned. The exception to this rule is where a provider is using the same spectrum, but delivering different underlying technologies such as 3G, 4G, or 4G LTE. In this case a continuous polygon is being created that represents the area that is offered for both 3G and 4G even if these polygons overlap.

10) In this submission, for landline broadband, we removed blocks and roads that are in water-only census blocks. We communicated this to providers at the beginning of data collection to make sure they would let us know if they really served on blocks that were water only and no population

11) Where providers told us to reuse data from previous submission or did not respond to our data request, we are resubmitting data that was submitted in S6.

12) In the final stages of processing this submission we noticed that some providers are delivering street segments that appear to be new roads that have been constructed since the 2010 data was created, but they are not in the official Census 2010 geometry data. These roads were dropped from the submission, but we are going to look into a process to add these roads to the next submission if they can be verified as accurate. **Some guidance on this from NTIA may be useful so all states are doing this consistently.**

13) In this submission, we also found that some providers were using street segments that collapsed multiple census streets into a single segment. We have used manual processes to select roads in the census data for such providers.

We have added the following new providers in this submission:

a. Resonance Broadband (fixed wireless)
b. Clearwire Corporation (mobile wireless)
c. Airosurf Communications - same as Brinks Networks (fixed wireless)
d. Precision Wireless (PWI) (fixed wireless)

For this submission:

1) We have contacted a total of 199 providers in OK, of which 6 providers were contacted for the first time.
2) We have identified 109 potential providers, of which 94 are participating in this map to date and 15 have refused to participate. In addition, 20 providers have not responded to our efforts to contact them and we are not sure whether any of these providers are actual providers or not. A list of the non-responders, resellers and non-providers is provided at the end of the document and all of these potential broadband providers were contacted. Even if some providers were identified as non-providers or resellers in previous submissions, we continue sending out data request letters to these providers in case their status has changed in any way.
3) Approximately, 43% of the providers submitted new or updated data whereas for the remaining providers, we reused data from their

previous submissions. This is in contrast to 44% providers submitting new or updated data during the previous submission.

4) We do not report areas of service for providers that have refused to participate or have not responded to our requests for data. In some cases program office staff is aware of approximate service areas for non-participating providers, but to date we have reported only areas that meet our validation criteria. If estimated service areas are desired we would collaborate with other states and NTIA to develop and disclose a workable methodology.

During this submission period, we had the following changes in providers:

1) Xanadoo was bought by Jab and will change DBA to Jab. Jab is also part of Rhino.
2) James Cable changed DBA to Mediastream

2.1.2 Community Anchor Institutions Data

The community anchor institutions data continues to be crowd-sourced through the online data gathering application created by the Sanborn Team. The numbers of community anchor institutions that have responded so far is provided below:

Category	Name	Total in Submission 7	Total with Broadband Information in Submission 7
1	School - K through 12	1978	543
2	Library	212	175
3	Medical/healthcare	459	162
4	Public Safety	1810	421
5	University, college, other post-secondary	79	22
6	Other community support - government	506	101
7	Other community support - nongovernmental	16	2

2.2 DATA PROCESSING

We started with the following base data:

Census Blocks:

For this submission, Census 2010 data was utilized. The data was set up as follows:

- Block size (AREA) is calculated combining the 2010 land area (ALAND) and water area (AWATER)
- AREA is converted from square meters to square miles to calculate square mileage (SMI).
- If the SMI of a block is less than or equal to 2, then the less than or equal to 2 square mile indicator (LE2SMI) is set to true.

Road Segments:

2010 Tiger Line IDs (TLID) were used for data processing for this submission. The data was set up as follows:

- The GT2SMI (Greater Than 2 Square Mile) indicator is set to True when:
  - The 2010 road segment is completely within a block that is NOT less than 2 square miles
- Only minimum and maximum address ranges and a single zip code for each road segment is maintained.

All data received went through the following processing steps:

1) **Triage:** All new data were quickly reviewed to understand what was received, and in what format. We also made sure we had all the required components for NTIA's data model, such as their FRN and advertised speed information. We also screened for any known issues that we might have seen before (such as Excel 2003 spreadsheets that cut off at 32k row).
2) **Ingest:** At this time the data is actually brought into our systems. Each provider is set up with a unique file geodatabase to store their information. Record counts of what was received are logged so that we can validate that we did not drop anything in processing.
3) **Data Processing:** In this step, the data goes through a number of ETL routines to convert the raw proprietary information into a format similar to the NTIA format. The exact routine utilized depends on how the data is received.
    a. When a wireline provider submits a service boundary, we select all the blocks and roads inside that shape.

b. If a wireline provider submits a customer address list, the points are geocoded, and then the appropriate block or road segment is selected.
c. If a wireline provider submits block and road information using Census data, we just make sure everything is formatted to the appropriate specifications.
d. If the wireline provider submits any type of road or line data that does not directly correlate to the TIGER data set, we convert the lines to TIGER by selecting the road centroid and spatially selecting the closest segment in our data set. If the road is in a block less than 2 square miles, then the block is selected. Some manual cleanup is also applied to make sure we do not accidentally drop any road segments that should have been processed.
e. Wireless provider data is formatted to ensure that there are no overlapping polygons with the technology type and spectrum. In addition the data is cropped to the state boundary.
f. After each round of processing, we make sure that we only keep unique records. A unique record is defined as having a unique combination of FRN, Block/Road ID, and technology type. If there are multiple records with different speeds, but all else is equal, than we select the maximum of the advertised speeds.

4) **QC Review:** All data are then sent to a different analyst to perform a thorough quality control review on the processed data set. Record counts are compared to what was submitted. The QC staff also makes sure the ETL scripts and routines populated all of the right fields.
5) **QA Review:** Data is then sent to another team for Quality Assurance Review. In this step the data are not only double checked against what was originally submitted, but it is also brought up inside standardized ArcMap templates that allow us to make sure our results make sense. This often involves comparing the new data set with prior submissions, as well as looking for any possible technology or speed anomalies and verifying against third-party datasets (as discussed in more details in the next section).
6) **Provider Review:** Processed data is all posted to a customized web-mapping tool we commonly refer to as the Provider Portal. All providers were notified once their data was available on the site, and were given five business days (with the exception of a couple who were provided three business days) to review the data and respond. In this site, providers can log on and visually see their processed data in a map format. It also allows them to overlay their raw data to help them validate that we did indeed process things correctly. The provider portal also has a suite of markup tools that will allow the providers to edit their data, including adding or removing service areas, and making changes to the data attributes.
7) **Comment Processing:** All comments and feedback received from the provider portal is then reviewed and applied to the processed data set. This updated data set goes back through our QA and QC processes, and if time allows, back out to the Provider Portal, for the provider to review and sign off.

8) **Data Append:** After all of the individual data sets are processed and approved, we run an append process which merges all of the individual provider data sets into one geodatabase. This is also the point where our team will do any final transformations to get our working data model into the latest NTIA publishing format.

9) **Submission Comparison Check:** Starting with this submission an additional check was added to our quality review process. An application was written that compares the individual provider's unique data that is stored in their unique file to that which is stored in our final appended file and the NTIA submission data. Any variation in each of these data files in thoroughly investigated and resolved. This was done to assure no data loss or data transformation issues. We also compare the submission 6 dataset to the submission 7 dataset, review any variations and assure that the changes found can be documented as being requested by the provider.

10) **Final QA/QC:** A series of quality checks are run on the final appended data sets to ensure it is ready for submission to NTIA. We also run the latest version of the NTIA receipt tool at this time. If any issues are flagged as failing they are reviewed and corrected. All warnings are also reviewed and either corrected or documented in the attached document which explains that we have validated this data and any last issues are corrected.

11) Submission to NTIA.

2.3 DATA VALIDATION

Sanborn has continued to perform the same validation on the data as the previous six submissions (details in previous reports and a summarized version provided below). Some minor updates to the validation process are discussed below.

1) QC of the data at various steps – this includes when data are received (triage), when it is processed through the various processing steps discussed above, etc.
2) Spatial checks against public and commercial datasets
    a. For OK, we continued to use the following datasets for validation:
        i. Exchange Boundaries: for DSL boundaries
        ii. MediaPrints: for Cable and Fiber boundaries
    b. We did not use speedtest.net speed data that we used previously for validation as we had our own speed test data that was more current and pertinent.
3) Speedtest data and other data collection for verification
    a. We continue to use speedtest data collected through our interactive map and community anchor data crowd-sourced for validation purposes.

b. We also incorporated any feedback we received through the interactive map – this included feedback such as incorrect speeds, incorrect boundaries, missing provider or areas of no service, etc.

4) Verification by providers – processed data are uploaded on our Provider Portal for providers to review both the outcome of data processing and any issues that we found in the third-party and crowd-sourced validation. Issues pertaining to a particular provider are highlighted and shown in the portal for those providers only. Issues that are global and cannot be assigned to a particular provider are shown to all providers (e.g. there are no providers in this area, or we tried to get service here and heard x from A provider, y from B provider, etc.). Previously, we were highlighting these issues through a letter but in this submission, we have integrated the feedback through the Provided Portal. We make additional calls to providers who have issues.
5) Planning workshops and local validation –
    a. During this submission, local validation was undertaken by an independent group, the Center for Spatial Analysis at the University of Oklahoma (OU). OU provided outreach staff which worked with community leaders and participated in five community-wide events or meetings in targeted rural areas to conduct interviews that resulted in in gathering additional validation points. Face-to-face interviewing with business owners and employees of publicly accessible organizations was targeted to rural underserved or unserved areas with limited validation information available. From October through March, data points for validation were collected through traditional mail service, online, telephone and face-to-face survey methodologies. OU also encouraged individuals interviewed to refer others to take the online survey. For those individuals lacking internet access, they provided hard copy surveys with postage paid business reply envelopes.
    b. Sanborn provides each submissions non-confidential data to the University of Oklahoma Center for Spatial Analysis for additional verification. Any conflicts noted in the data by Oklahomans based on outreach done by OU are confirmed as valid by Sanborn and then given to the provider to validate/correct via Sanborn's provider portal.

2.4 Submission 7: NTIA Submission Data Model Schema Changes

The latest data model released was released in December 2012 and was very similar to the previous data model. No substantive changes were noted and changes related to allowable speed and technology of transmission combinations. Most of these combinations have exceptions to them and hence were not being completely disallowed by NTIA.

2.5 UNIVERSE OF CONTACTED PROVIDERS/NON-PROVIDERS

We have contacted a total of 199 providers in OK of which 6 providers were contacted for the first time.

We have identified 109 potential providers, of which 94 are participating in this map to date and 15 have refused to participate. In addition, 20 providers have not responded to our efforts to contact them and we are not sure whether any of these providers are actual providers or not. A list of the non-responders, resellers and non-providers is provided at the end of the document and all of these potential broadband providers were contacted. Even if some providers were identified as non-providers or resellers in previous submissions, we continue sending out data request letters to these providers in case their status has changed in any way.

2.5.1 Non-providers

4D Networks Corp.
ACRS 2000, Inc.
Atlas Telephone Company
Charter Communications
COMCAST CABLE COMMUNICATIONS, INC.
Cyber Rover
Fulltel
IO-2 Services
KoehlerPro Wireless
LightEdge Solutions Inc
Magic Wireless Internet Service Providers LLC
McLeodUSA Telecom Services Inc / PaeTec Corp
OKC Broadband (Ideal Advertising Inc)
Oklahoma 5 Licensee Co., LLC
OneNet
PCS Internet Services
Qwest Communications Company, LLC
Stouffer Communications / Granby Telephone
Telovations, Inc.
Texhoma Wireless
The Internet Shop
Tulsa MetroNet
United Wireless Communications, Inc.
University Corporation for Advanced Internet
UnplugUSA
UTPhone Inc

Verizon Business Global LLC dba Verizon Business
Zayo Enterprise Networks, LLC

2.5.2 Resellers

Broadview Networks Holding Inc
BullsEye Telecom, Inc.
Earthlink
Enventis Telecom Inc / Hickory Tech Corp
Global Crossing Telecommunications Inc.
Greenfly Networks, Inc
Logix Communications, LP
Metropolitan Telecommunications of Oklahoma, Inc.
New Edge Network, Inc.
Reallinx, Inc.
Telefonica USA, Inc.
TulsaConnect
Westel, Incc

2.5.3 Non-Responders/Difficulty Contacting

ALLIANCE COMM NETWORK
Cable West
Coalgate Internet
CSWEB.NET
DataFlys
Datz
eConnect
Flash-Link Internet Service
HDR Internet Services/ OnALot.com
INETmax
KPowerNet, LLC/KAMO
Lakeview Cable
MEDIACOM LLC
ms bit
Onlineok.com
ruralOK
upperspace.net
Utopian Wireless Corporation
VectorLink
Wireless Broadband of Oklahoma

2.5.4 Not-Participating

Atlas Broadband
BartNET
EasyTEL Communications
eVolve Business Solutions LLC/Cincinnati Bell Inc
horizon net
LRC Group
Meriplex Communications, Ltd.
OneLink Wireless
PriceNET Wireless

Reach Broadband
Stratos Offshore Services Company
Summit Digital, Inc.
The Junction
Vroom Wireless, LLC
WEHCO Video, Inc.

Oregon Broadband Mapping Project Methodology

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Product Specification: Spring 2013 NTIA Data Model
Product/Process: NTIA—April 1, 2013 Data Deliverable
Dataset Submission QC: NTIA—SBDD_CheckSubmission.py

Table of Contents

Contents

OVERVIEW

This white paper highlights the **Submission Summary** for this deliverable, as well as describes the **Data Gathering**, **Data Integration**, **Data Validation and Verification** and **Quality Control** processes used to create the Oregon Broadband Mapping Project's April 1, 2013 data submission. To support varying levels of technical and program knowledge, both a **process summary** and a **process review** are supplied.

SUBMISSION SUMMARY

PROVIDER DETAILS

PROVIDER PARTICIPATION

- Provider Participation Statistics Summary

Summary	Count
Total Providers Researched/Contacted	463
Total Valid Broadband Providers	113
Non-Responsive Providers	8
Non-Cooperative Providers	5
Number of Providers - Supplied Updates for this Submission	50
Number of Providers - Confirmed No Updates	49
Will Provide Data	1

- New Providers since Last Data Submission (5)
  - Fibersphere
  - FireServe LLC
  - DC Wireless
  - Siuslawbroadband
  - M2 Machmedia

- Existing Providers – No Updates, confirmed (49)
  - City Of Cascade-Locks
  - Rio Networks
  - Hunter Communications Inc
  - Starband.net
  - Communications Access Cooperative Holding Enterprise
  - Clear Creek Mutual Telephone Company
  - Blue Mountain Cable

- EONI.Com
- Gorge Networks
- PocketiNet Communications Inc
- Axxis Communications
- Ashland Fiber Network
- LS Networks
- Whiz To Coho, Inc.
- Nehalem Telecommunications Inc.
- SCIO Mutual Telephone
- Comspan Communications, Inc.
- Alyrica
- Cal-Ore Communications Inc.
- Canby Telcom
- Mount Angel Telephone Company
- Country Vision Cable Inc.
- Helixtel.Com
- J & N Cable Systems, Inc.
- OnlineNW
- Molalla Communications Company
- MINet
- Monroe Telephone
- Skycasters
- Safelink Internet Services
- SawNet
- Rural Technology Group
- SCS Communications
- Stephouse Networks
- ORCA Communications
- OregonFAST.Net
- Webformix Company
- Zayo Group LLC
- Reliance Connects (Trans-Cascade Telephone , Cascade Utilities)
- North-State Telephone Co.
- Pioneer Telephone Cooperative
- Qualitylife Intergovernmental Agency
- SandyNet
- Roome Telecommunications Inc.
- Rural Network Services Inc
- St Paul Telephone
- CoastCom, Inc
- Unwiredwest Internet
- Viasat Communications

- Providers Included by DBA

Air Speed LLC	Freewire Broadband Llc	Quantum Communications
Alyrica	Frontier Communications Northwest Inc.	Reliance Connects (Cascade Utilities)
Ashland Fiber Network	Frontier Communications Of Oregon	Reliance Connects (Trans-Cascade Telephone)
AT&T Mobility LLC	Gervais Telephone Company	Rio Networks
Axxis Communications	Gorge Networks	Roome Telecommunications Inc.
Beaver Creek Telephone Company	Helixtel.Com	Rural Network Services Inc
BendBroadband	HughesNet	Rural Technology Group
BendTel	Hunter Communications Inc	Safelink Internet Services
Blue Mountain Cable	Integra Telecom	SandyNet
Cable ONE	J & N Cable Systems, Inc.	SawNet
Cal-Ore Communications Inc.	Level 3 Communications, LLC	SCIO Mutual Telephone
Canby Telcom	LS Networks	SCS Communications
Cascade Networks, Inc.	M2 MachMedia	Silver Star Telecom
CenturyLink	MegaPath Corporation	Siuslawbroadband
Charter Communications Inc.	Meritel Group, Inc	Skycasters
City Of Cascade-Locks	MINet	Sprint
Clear Creek Mutual Telephone Company	Molalla Communications Company	St Paul Telephone
Clearwire	Monitor Cooperative Telephone Company	Starband.net
CoastCom, Inc	Monroe Telephone	Stayton Cooperative Telephone Company
Cogent Communications Group	Mount Angel Telephone Company	Stephouse Networks
Coltontel	Nehalem Telecommunications Inc.	TDS Telecom
Comcast	NextGen Internet Systems, Inc.	T-Mobile
Communications Access Cooperative Holding Enterprise	Nextnet Ventures, LLC	Tnet Broadband
Community Broadband	North-State Telephone Co.	TW Telecom Of Oregon LLC
Comspan Communications, Inc.	OnlineNW	U.S. Cellular
Country Vision Cable Inc.	ORCA Communications	Unwiredwest Internet
Crestview Cable	Oregon Telephone Corporation	Upward Access
Cricket Communications, Inc.	OregonFAST.Net	Verizon Wireless
Datavision Communications	Oregon-Idaho Utilities, Inc.	Vertex SSX Corporation
DC Wireless	PEAK Internet	Viasat Communications
Douglas Fast Net	Pendleton Fiber Company	Wallowa Valley Networks
Eagle Telephone System, Inc.	People's Telephone Company	Warm Springs Telecom
EarthLink Business	Pine Telephone Systems, Inc.	Wave Broadband
Eastern Oregon Telecom	Pioneer Telephone Cooperative	Webformix Company
Elgin TV Association	PocketiNet Communications Inc	Whiz To Coho, Inc.
EONI.Com	Prinetime Internet Solutions	Wtechlink
Fibersphere	Qnect.Net	Yellowknife Wireless Company, LLC
FireServe	Qualitylife Intergovernmental Agency	Zayo Group LLC

- Non-Responsive Providers (8)
  - Air Speed LLC
  - EarthLink Buisness
  - HughesNet
  - Integra Telecom
  - Nextnet Ventures
  - Prinetime Internet Solutions
  - Quantum Communications
  - Vertex SSX Corporation

- Non-Cooperative Providers (5)
  - BendTel
  - Cogent Communications Group
  - Meritel Group, Inc.
  - NextGen Internet Systems, Inc
  - Qnect.Net

- Other Provider Changes

Name Changes

Unwiredwest – changed name to XS Media

Acquisitions and merges

None

Additional providers identified as non-broadband this round

Tillamook Lightwave
Clearfly Networks, Inc.
Harney Education Service District
Light Tower Fiber Long Island LLC
Noble Creek Communications
WCS Wireless License Subsidiary, LLC (NextWave Wireless INC.)

- Providers researched and identified as non-broadband providers can be viewed within the table at the end of this document.

COVERAGE AREA CHANGES

- Coverage Footprint Reductions/Map Refinement –
  - BendBroadband (TT-41)
  - CHARTER COMMUNICATIONS INC. (TT-41)
  - Crestview Cable Communications (TT-41)
  - Freewire Broadband LLC (TT-71)

- Technology Changes/Additions –
  - Cascade Networks, Inc.(TT-50)
  - Community Broadband (TT-70)
  - Crestview Cable Communications (TT-40)
  - DC Wireless (TT-70)
  - DC Wireless (TT-71)
  - Eastern Oregon Telecom (TT-41)
  - Elgin TV Association, Inc. (TT-41)
  - Fibersphere (TT-50)
  - Fibersphere (TT-70)
  - FireServe (TT-70)
  - MegaPath Corporation (TT-10)
  - MegaPath Corporation (TT-20)
  - MegaPath Corporation (TT-30)
  - Pine Telephone Systems, Inc. (TT-70)
  - Silver Star Telecom (TT-10)
  - Silver Star Telecom (TT-20)
  - Silver Star Telecom (TT-30)
  - Siuslawbroadband (TT-70)
  - TDS TELECOM (TT-10)
  - Tnet Broadband Internet Llc (TT-71)

- Coverage Footprint Expansion –
  - AT&T Mobility LLC (TT-80)
  - Beaver Creek Telephone Company (TT-50)
  - BendBroadband (TT-40)
  - BendBroadband (TT-50)
  - BendBroadband (TT-71)
  - CenturyLink (TT-10)
  - CHARTER COMMUNICATIONS INC. (TT-40)
  - Comcast (TT-40)
  - Cricket Communications, Inc.(TT-80)
  - Douglas Fast Net (TT-10)
  - Douglas Fast Net (TT-50)
  - Eastern Oregon Telecom (TT-50)

- Eastern Oregon Telecom (TT-70)
- Frontier Communications Northwest Inc.(TT-10)
- Level 3 Communications, LLC (TT-50)
- Monitor Cooperative Telephone Company (TT-5C
- Oregon Telephone Corporation (TT-10)
- Oregon-Idaho Utilities, Inc. (TT-10)
- Pendleton Fiber Company (TT-50)
- People's Telephone Company (TT-50)
- Silver Star Telecom (TT-50)
- Sprint (TT-80)
- Stayton Cooperative Telephone Company (TT-50
- TDS TELECOM (TT-10)
- T-Mobile (TT-80)
- TW Telecom of Oregon LLC (TT-30)
- TW Telecom of Oregon LLC (TT-50)
- U.S. Cellular (TT-80)
- Verizon Wireless (TT-80)
- Wallowa Valley Networks (TT-70)
- Webformix Company (TT-70)
- Webformix Company (TT-71)

COMMUNITY ANCHOR INSTITUTION (CAI) DETAILS

OVERALL STATISTICS

Community Anchor Institution - Categories	Overall Count	Broadband Subscriber	Trans Tech	Advertised Speed Down	Advertised Speed Up
Category 1 - School K through 12	2209	569	547	533	533
Category 2 - Library	220	211	210	206	204
Category 3 - Medical/Healthcare	417	156	153	151	150
Category 4 - Public Safety	1136	164	115	66	66
Category 5 - Universities/Colleges	72	43	43	42	42
Category 6 - Other: Government	227	36	219	28	28
Category 7 - Other: Non-Government	19	3	2	1	1
Total	4300	1182	1289	1027	1024

Total CAI records: 4,300

Broadband Service - Yes	1182	27%
Broadband Service - Unknown	3118	73%

Broadband Service - Yes

Unknown Technology Type	90	8%
Unknown Download & Upload Speed	161	14%
Download & Upload Speed	1018	86%

Public Wi-Fi Unknown	98%
CAI with CAIID	59%
Schools with No CAIID	23%

CAI CHANGES

- New Library data has been added to CAI dataset. Including connectivity updates and additional CAI records for this category.
- School data has been enhanced with additional information concerning address confirmation, CAI identification assignment and associated broadband connectivity. Additional schools have also been added.

PROCESS REVIEW

1. **Provider Outreach and Data Collection**

   Data is collected from identified broadband ISPs via a process of e-mail notifications and telephone interactions designed to achieve the maximum number of positive responses. ISPs can supply data and/or updates in a number formats via the following communication channels: mail, e-mail, and web applications (provider portal and file upload tool).

2. **Data Ingestion and Processing**

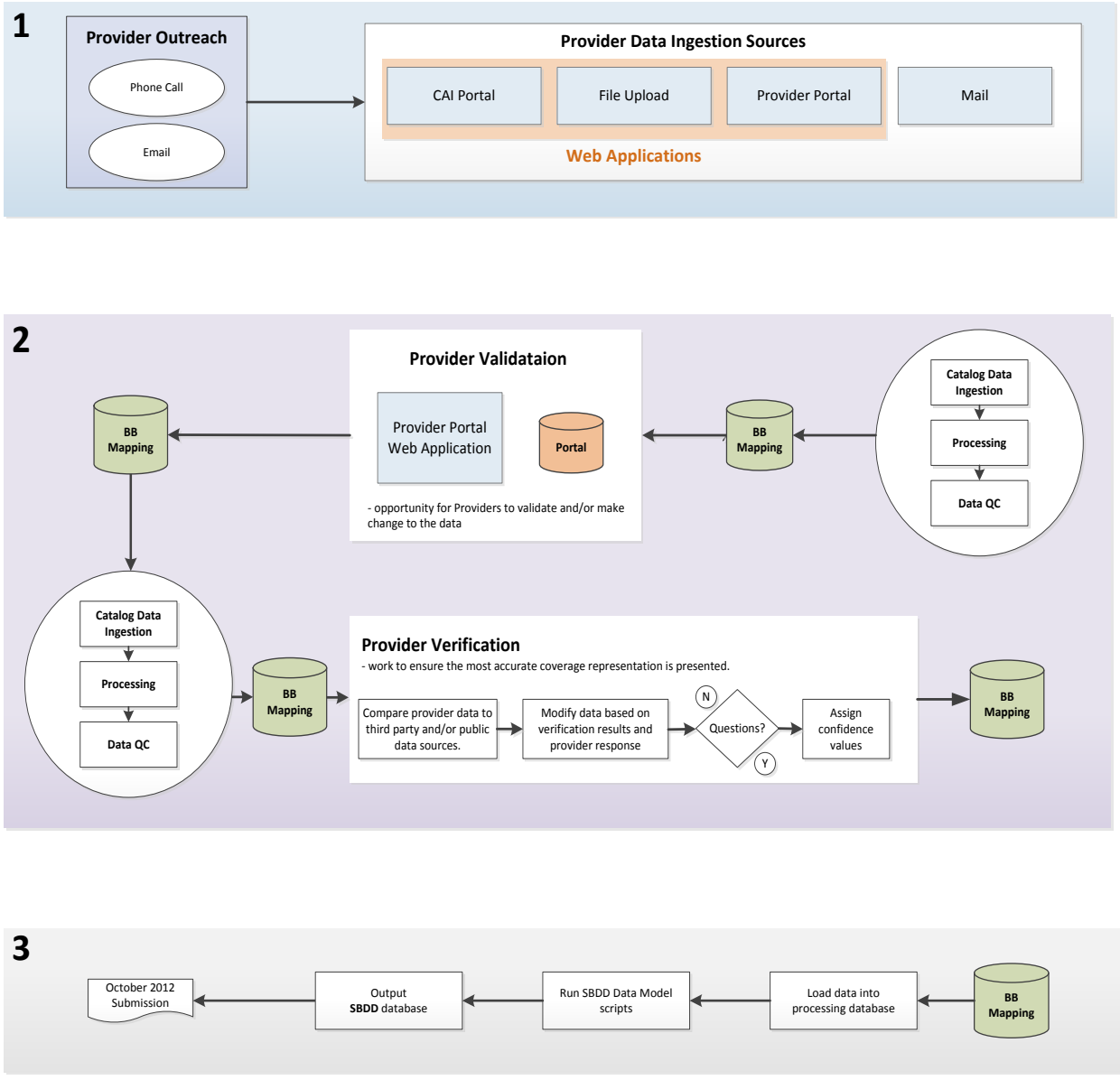
   Acquired data enter a recursive multi-stage editing, validation and verification process until all parties are satisfied that the data is a good representation of both the ISP service area and level of service. Automated scripts run nightly that capture updates posted by an ISP and publish completed updates to the provider portal web application for further provider review.

3. **Reporting**

   At the close of each data collection period all ISP and CAI data is passed through a set of automated processes that parse the geospatial data into the format required for NTIA submission, flag potential data errors and generate associate tabular reports. The final outputs are combined into a single archive file for submission via the Broadband State Data Management Tool hosted by the FCC.

* Process Review Diagram, sections reference below numbered diagram (pg.10)

* Process Review Diagram, sections reference above numbered paragraphs (pg.9):



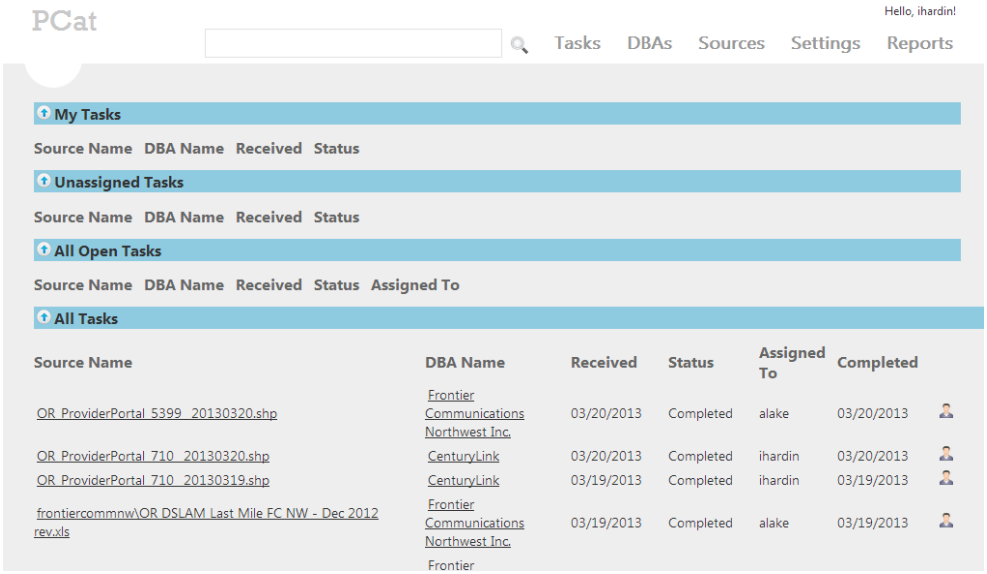
PROCESS SUMMARY

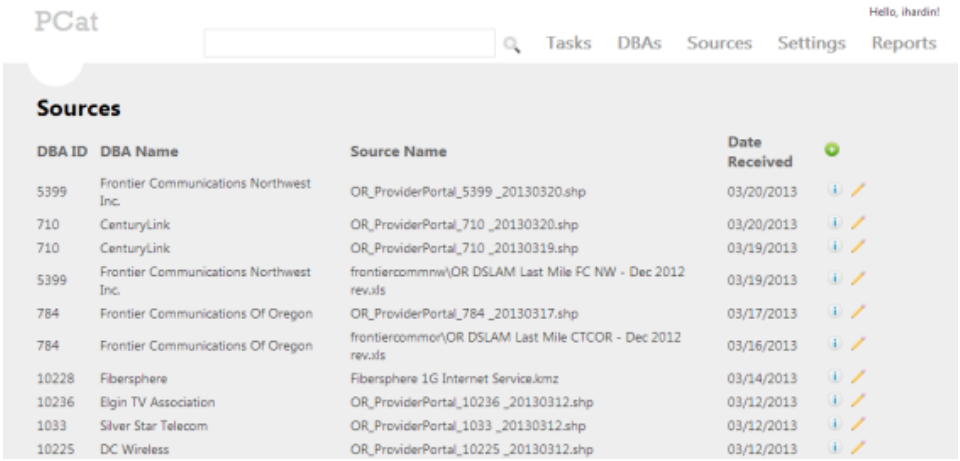
DATA GATHERING

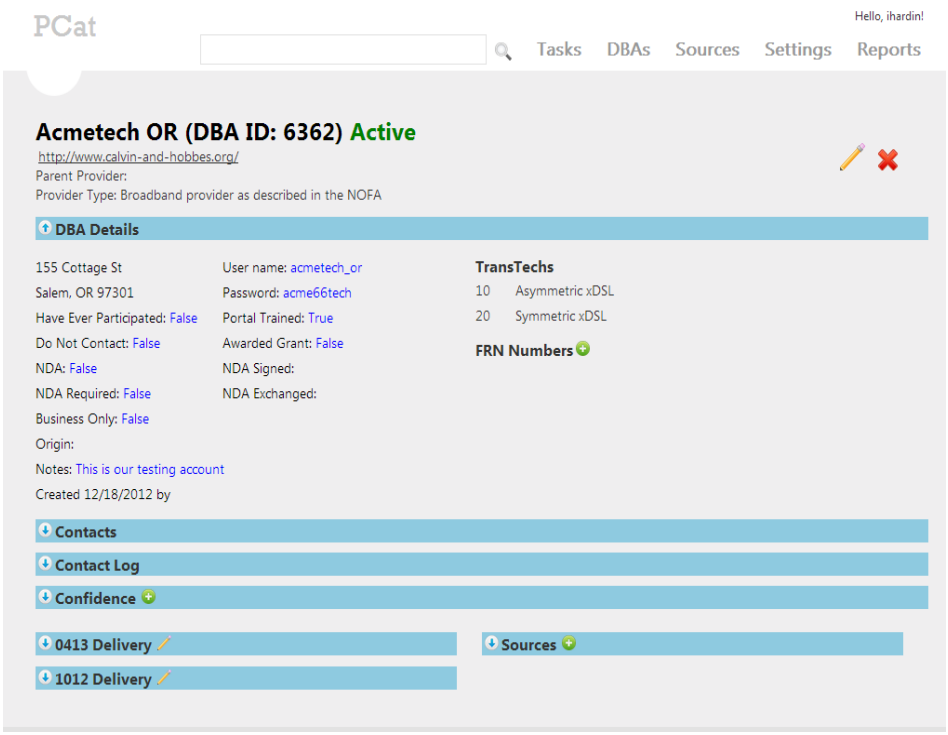
BROADBAND SERVICE AREAS, MIDDLE MILE AGGREGATION POINTS AND BROADBAND SERVICE OVERVIEW

The collection of Broadband Service Areas, Middle Mile Aggregation Points and Broadband Service Overview information is handled through the following Provider Outreach Process:

- Build and maintain an inventory of Broadband providers through currently known providers and research.
- The inventory and everyday interaction with providers is tracked using the Provider Catalog (PCat). Below are some examples of the web application.







- Update provider material that describes the data requirements and logistics for data transfer.
- Update Non-Disclosure Agreement (NDA) for use in the project, where applicable.
- Maintain multiple protocols for the provider to submit data, including Secure File Upload Protocol when desired.
- Conduct one-on-one informational discussions with each provider to communicate the following:
    - Requirements of this project;
    - Broadband data required to support the product data model;
    - Submission protocols available;
    - Capability to validate how the supplied data is aggregated.
- Download/receive provider data.
- Establish a repeatable process with provider. Maintain provider communication, transaction and data handling records throughout the project (dates contacted, data received, etc.).

COMMUNITY ANCHOR INSTITUTION (CAI)

The collection of CAI information is handled through the following CAI Collection Process:

- Collect and maintain inventory of CAIs through currently known CAIs, data mining, and research.
- Maintain web-based CAI portal for institutions to add or confirm attribution, location and enter broadband-specific information.
- Upload web-based data to Core Database for standardization.

- Perform internal cleansing, such as removing duplicate records, identifying gaps in broadband attribution and verifying category.
- Geocode CAI locations.
- Translate Core Database data to deliverable-ready format.
- Continue engagement with non-responsive institutions.
- Communicate with Oregon State departments to acquire CAI data.

DATA INTEGRATION PROCESS

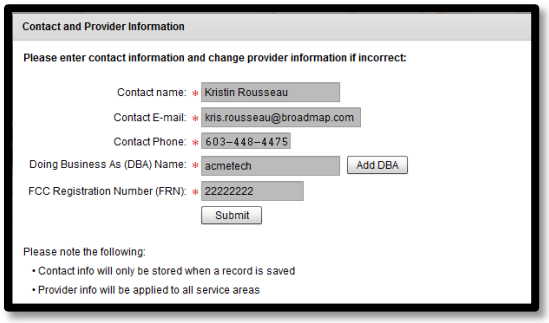
The data integration and processing mechanisms currently used allow for multiple types of inputs and result in a standardized output that meets the NTIA deliverable requirements. This flexible process supports data model changes and project-requested enhancements.

- Receive inputs from providers via submission protocols; upload into Sourcing Database and catalog with provider information.
- Review provider-supplied data for completeness and for potential discrepancies that require resolution prior to processing and flag as necessary.
- Categorize input into data-type category (addresses, block lists, paper maps, etc.).
- Standardize input based on data type within BB Mapping Database.
- Create Compact Polygons (CP)—(internal methodology for generating area-based feature for coverage in BB Mapping Database).
- Apply broadband attribution to CP; apply metadata to CP.
- Perform quality analysis of the CP against the source supplied to identify any completeness or accuracy issues.
- Post data to the provider portal web application for provider review and validation.
- Request additional information from the provider if elements of coverage are missing or contain discrepancies. This is a second manual quality check to ensure data is complete.
    - Process coverage area to build the required NTIA data model layers.

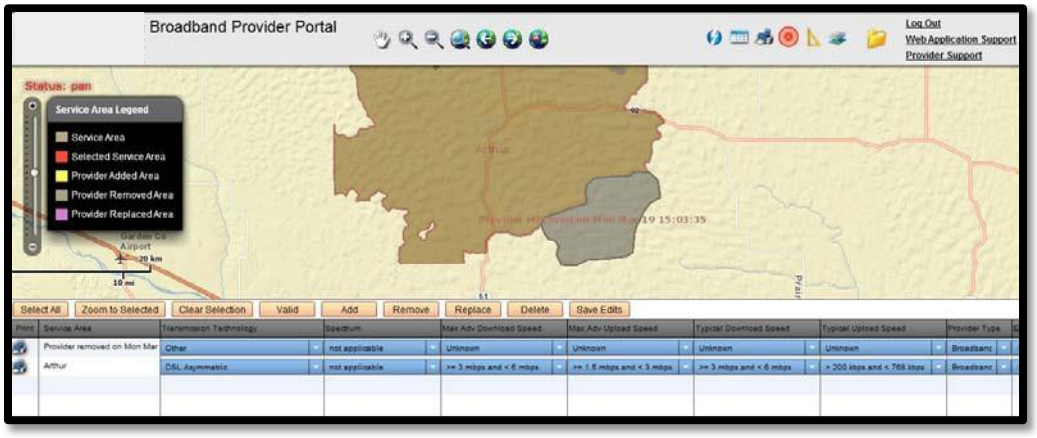
With the deployment of the Provider Portal, the data collection and later validation process was streamlined allowing both activities to occur within a secure web application. The majority of the providers used this methodology as it supplies them with more visibility into how their data is being represented and gives them knowledge and ownership of their coverage representation. Below are some bullet points and supporting screen shots on how the portal is used.

- Each provider is assigned credentials with a strong password to ensure security measures are taken into consideration

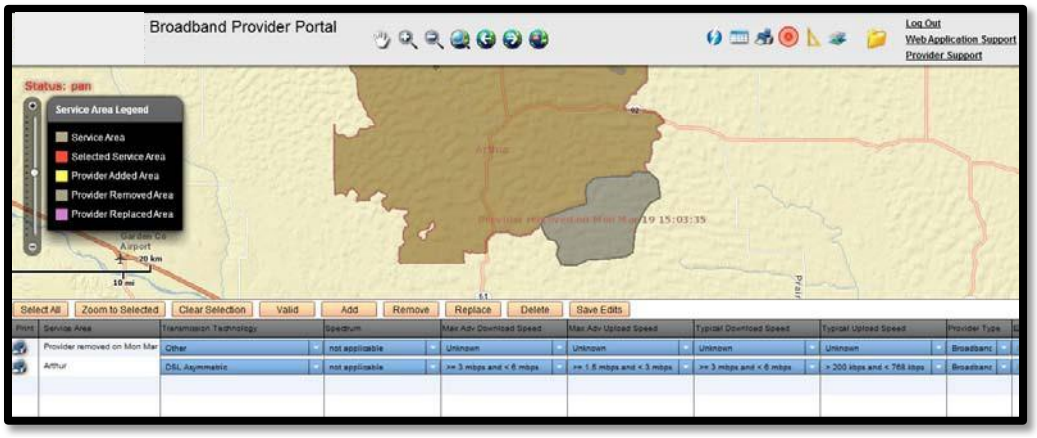
- Collection and confirmation of contact, as well as the company's DBA Name and FRN accuracy



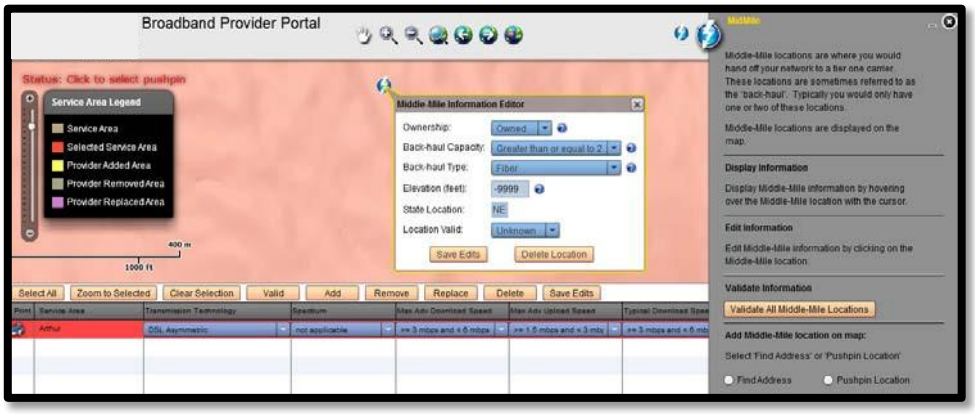
- Capability to review and request changes to the coverage footprint

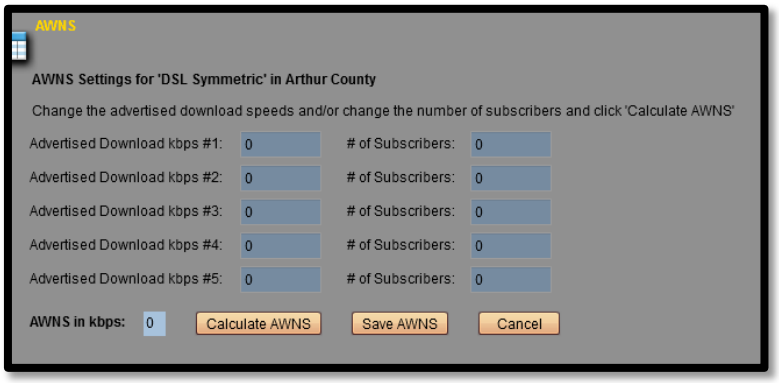


- The provider can Add/Remove portions, or all, of the footprint requesting that their footprint be increased or refined.

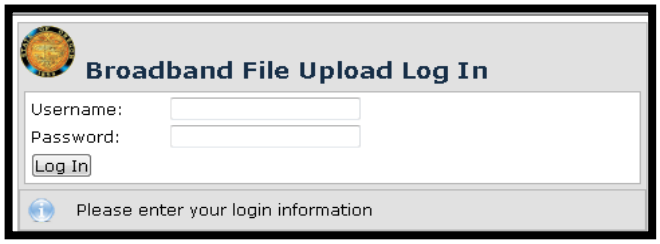


- Middle Mile and Average Weight Nominal Speed (AWNS) collection and validation





- File upload functionality to support providers that would prefer a shape file, spreadsheet, PDF, KMZ/KML file be used to reflect changes for the data round



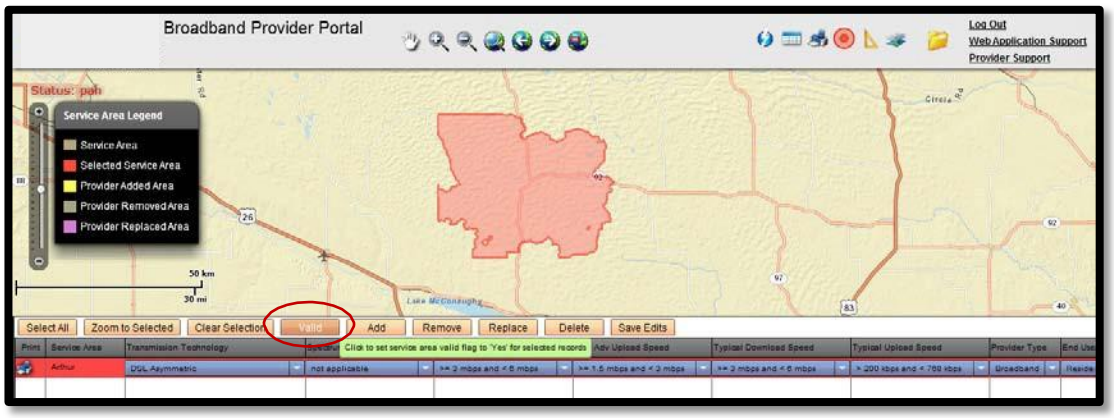
- Once the provider has reviewed and/or completed changes to their coverage, middle mile and AWNS, they may validate by selecting the validate field for each feature.

DATA VALIDATION AND VERIFICATION

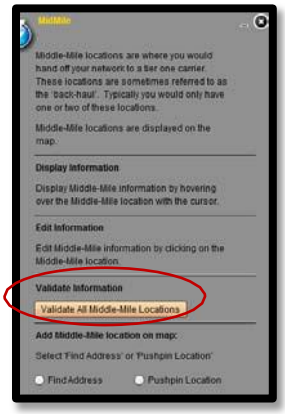
Following the creation of the product, process steps within Data Validation and Verification occur. To ensure the data collected and processed is as accurate and comprehensive as possible, provider validation and internal verification activities are employed. After the initial mapping of providers' coverage areas and serviceability claims, additional reviews are performed using the methods described in the subsections below in order of action (**Broadband Provider Validation**, **Third-Party Data Verification**, **Public Verification, and Confidence Values**).

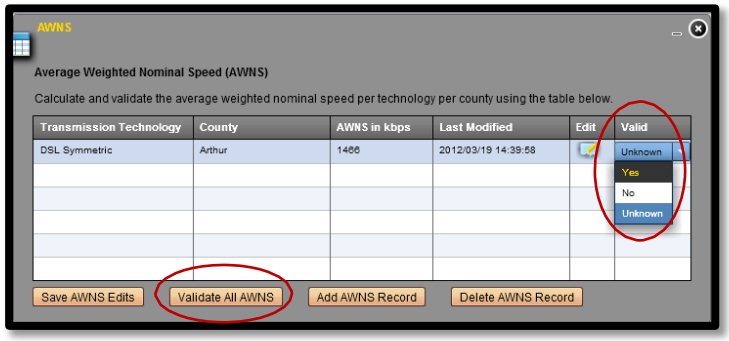
Validation examples are as follows:

- Coverage validation can be done on one record/footprint at a time or by selecting multiple footprints and selecting the 'Valid' button.



- Middle Mile & AWNS Validation





All validation results are tracked internally through the Validation Table, which is used to improve the overall **Confidence Value** of each provider.

THIRD-PARTY DATA VERIFICATION

The coverage is visually and programmatically compared against third-party data as new or updated coverage area information is received and ingested from providers. All anomalies identified during this analysis are reviewed with the providers. Whenever possible this process takes place before the report submission date. We work with the individual providers to address any outstanding issues. Providers that do not cooperate in this process are assigned a lower confidence value that reflects data quality issues and provider engagement.

3rd Party Source Name	Source Type	Verification Type
GeoTel	Fiber Routes and LitBuildings	Used to verify TT: Fiber to End User (50)
Pitney Bowes (PBBI)	Exchange Info Plus (Central Office Locations)	Exchange datasets are used to verify the following Transmission Technologies (TT): Asymmetric xDSL (10), Symmetric xDSL (20), Other Copper Wireline (30), and Optical Carrier/Fiber to the End User (50).
Media Prints	Cable Boundaries	Used to verify the following TT: Cable Modem—DOCSIS 3.0 (40) and Cable Modem—Other (41)
Mosaik Solutions	Wireless Coverage Patterns (EVDO, GPRS, WISP, HSPA)	Used to verify the following TT: Terrestrial Fixed Wireless—Unlicensed (70), Terrestrial Fixed Wireless—Licensed (71) and Terrestrial Mobile Wireless (80)
Comsearch	Wireless Spectrum Holdings and Tower Data	Used to verify the following TT: Terrestrial Fixed Wireless—Unlicensed (70), Terrestrial Fixed Wireless—Licensed (71) and Terrestrial Mobile Wireless (80)

PUBLIC VERIFICATION – CROWD SOURCING

Oregon Broadband Map

Public Feedback and speed test data

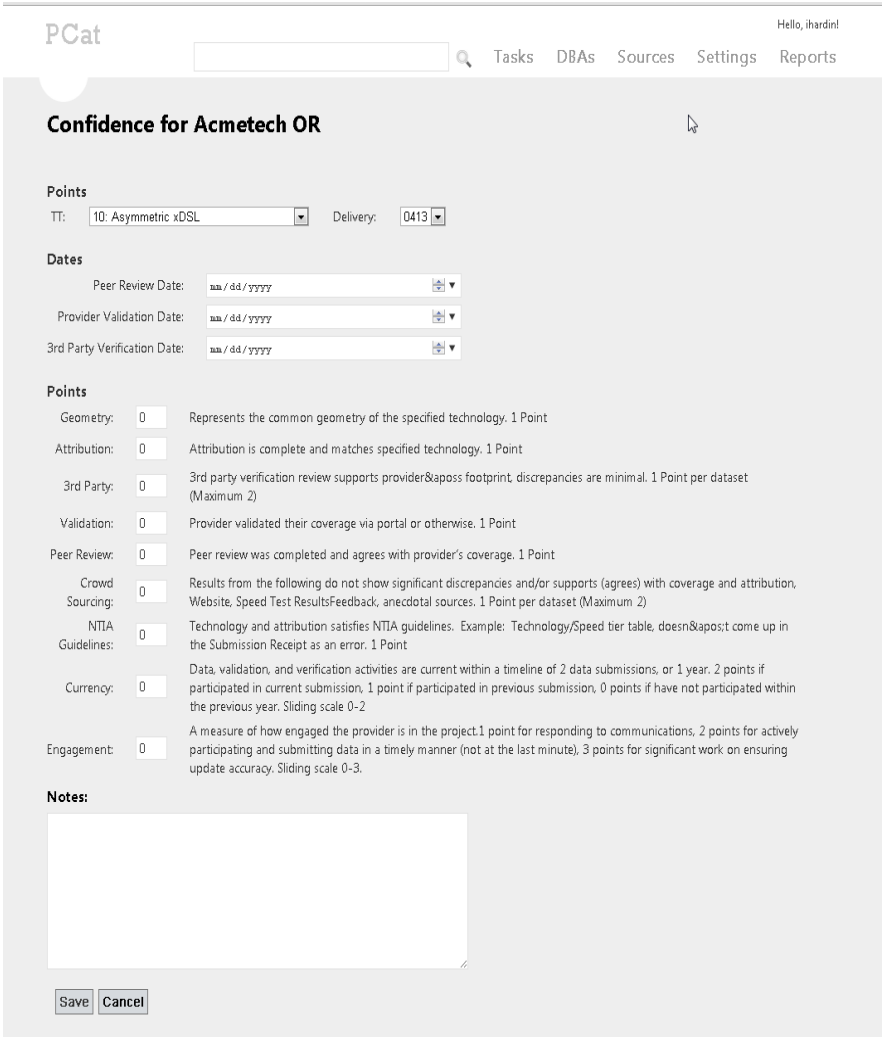
Since last data submission, we have improved the public website - interactive map to collect more detailed feedback on the represented broadband coverage areas. The feedback is also displayed on the map itself, which we're currently using as discussion points with providers during the outreach phases of each data submission. The data collected can be seen at the following path:

Hyperlink: **http://broadband.oregon.gov/StateMap/index.html**

FCC Speed test data:
Speed test results for Oregon submitted by individuals via the FCC browser and mobile based tools have been included in the verification process for this submission for supporting provider service area claims and bandwidth benchmarking.

CONFIDENCE VALUES

All verification, validation and manual quality review results are tracked by provider/technology type and stored and maintained within **PCat**. This stored data is used in combination with provider engagement and data vintage statistics contained in internal logs to generate a Confidence Value (CV). The CV reflects the overall confidence in the data displayed on the statewide broadband map. The detailed assessment that forms the basis for the CV is a useful tool that highlights the provider coverage areas and/or attributions that would benefit from further investigation and/or enhancements.



In addition to the continued efforts on provider validation, 3rd party verification and the release of the public interactive map with feedback collection functionality, the providers will be supplied their current

CV assessment in advance of the next data gathering event so each can identify the various ways their participation efforts can improve their CV rankings.

QUALITY CONTROL

Following collection, processing and analysis of the provider and CAI data, the product is checked manually and algorithmically against the NTIA data model. Some of the items included within these checks are:

- Format correctness;
- Table and field structure;
- Valid values, including default values, where applicable;
- Geographic extent and topology errors.

Prior to data submission, another quality control script supplied by NTIA is run. This script, SBDD_CheckSubmission.py, creates a text output form that is required to be submitted along with the final deliverable. All data must pass submission check unless otherwise specified by NTIA.

PROVIDERS RESEARCHED

This list represents all providers researched during the entire history of the program. Providers identified for this submission are highlighted.

1-800-Reconex Inc	Freedomstarr Communications Inc	Onesuite Corp
800 Response Information Services Llc	Frontier Telenet	Online Northwest
Access One Inc	Gci Communication Corp	Operator Service Co
Access Point Inc	Global Capacity Group Inc	Opex Communications Inc
Access2go	Global Connection Inc. Of America	Orbitcom
Accessline Communications Corporation	Global Crossing Local Services Inc	Oregon Govworks
Acn Communication Services Inc	Global Crossing North American Networks Inc	Oregon Health Network
Advanced Tel Inc	Global Crossing Telecommunications Inc	Oregon Telecom Inc
Advanced Telcom Inc	Global Crossing Telemanagement Inc	Outdoor Das - American Tower Corp
Advantage Telecommunications Corp	Global Tel*Link Corp	Pacific Northwest Telco, Inc.
Affinity Network Inc	Globalcom Inc	Pacific West
Affordable Voice Communications Inc	Globalstar Usa Llc	Pacific-South Telecom Inc
Afn, Inc.	Go Solo Technologies Inc	Pac-West Telecomm, Inc.
Agm Telecom Corporation	Gold Line Telemanagement Inc	Paetec Communications, Inc.
Airespring Inc	Goose Lake Computing	Para-Tech satellite
Airnex Communications Inc	Granite Telecommunications	Peerless Network Of Oregon, Llc
Alliance Global Networks Llc	Group Six Communications Llc	Pelzer Communications Corporation
Alliance Group Services Inc	Gtc Telecom Corp	Pic Professional Services
America Net Llc	Harbor Communications Llc	Png Telecommunications Inc
American Phone Services Corp	Harney Education Service District	Portland State University
American Telecommunications Systems, Inc.	Hickorytech/Eventis Telecom	Preferred Connections Inc. Nw
Americom Technologies Inc	Horizon Telecom Inc	Preferred Long Distance Inc

Amerivision Communications Inc	Hypercube Telecom Llc	Prime Time Ventures Llc
Andiamo Telecom Llc	Ibasis	Primus Telecommunications Inc
Applegate Broadband Llc	Ibasis Retail Inc	Priority One Telecommunication, Inc.
Applewood Communications Corporation	Ibfa Acquisition Company Llc	Public Communications Services Inc
Associated Cooperative Telecommunications Inc	Idt America Corp	Pulse Telecom Llc
Associated Network Partners Inc	Indigenous Telephone Inc	Quantumshift Communications Inc
At&T Mobility	Inetworks Group Inc	Quasar Communications Corporation
Atc Outdoor Das Llc	Infotelecom Llc	Qwest Corporation
Atl Communications Inc	Inland Development Corporation	Qwest Corporation
Atx Licensing Inc	Inmark Inc	Qwest Ld Corp
Bandwidth.Com Clec Llc	Inmate Calling Solutions, Llc	Radix Networks
Bcn Telecom Inc	Inmate Communications Corp	Reduced Rate Long Distance Llc
Bellsouth Long Distance Inc	Integrated Services Inc A Nevada Corporation	Reliance Globalcom Ltd. - Reliance Communications
Betterworld Telecom Llc	Intelepoint Llc	Reliant Communications Inc
Bg Enterprises Inc	Intelletrace Inc	Ridley Telephone Co Llc
Bigredwire.Com Inc	Intellicall Operator Services Inc	Rrv Enterprises Inc
Bluebird Wireless Broadband Services Llc	Intelligent Community Services Inc	Rural Services Company; Dba Ulatilla Electric Cooperative
Broadband Dynamics Llc	Intlepoint, Llc	Sage Telecom, Inc.
Broadcore	Intrado Communications Inc	Salem Hospital Regiona Health Center
Broadview Networks Inc	Ipc Network Services Inc	Sbc Long Distance Llc
Broadwing Communications Llc	J Irwin Community Informatics Consulting	Shared Communications Inc
Bt Communications Sales Llc	Kansas Independent Telecommunications Llc	Silv Communication Inc
Budget Call Long Distance Inc	Kddi America Inc	Smartrak Incorporated
Budget Prepay Inc	Kruse - Mercantile Professional Suites	Snake River Pcs
Buehner Fry Inc	Lane Telecommunications Services, Inc.	Snet America Inc
Bullseye Telecom Inc	Lcr Telecommunications Llc	Snip Link Llc
Business Discount Plan Inc	Ldmi Telecommunications Inc	Spacenet, Inc.
Business Network Long Distance Inc	Leap Wireless (Cricket Communications)	Sprinfield Utility Board
Business Telecom Inc	Legacy Long Distance International Inc	Sprint Communications Co Lp
California Oregon Broadcasting Inc	Legent Communications Corp	Startec Global Operating Company
Call Plan Usa Inc	Lewis & Clark College	Stelera Wireless
Cause Based Commerce Inc., - Dba The Sienna Group	Light Tower	Sterling Communications
Cbeyond Communications Llc	Lightyear Network Solutions Llc	Sti Prepaid Llc
Cci Network Services Llc	Lincoln County	Sungard Network Solutions Inc
Centel Communications Inc	Long Distance Charges Inc	Talk America Inc
Central Telecom Long Distance Inc	Long Distance Consolidated Billing Co	Tcast Communications Inc
Central Telephone Inc	Lotel Inc	Tcg Joint Venture Holdings Inc
Cimco Communications Inc (Comcast)	Lssi Data Corporation	Tds Long Distance Corp
Cincinnati Bell Any Distance Inc	Main Street Telephone Co	Technology Services Inc
City Of Eugene	Malheur Home Telephone Co	Tel West Communications Llc

City Of Klamath Falls	Master Call Communications	Telco Partners Inc
City Of Portland	Matrix Telecom Inc	Telecare, Inc.
Clear World Communication Corporation	Mcgraw Communications Inc	Telecom Management - Dba Pioneer Ld
Clearfly Networks	Mci Communications Services Inc	Teleconnect Long Distance Services & Systems Co
Closecall America Inc	Mcimetro Access Transmission Services Llc	Telenational Communications Inc
Coast International Inc	Mcleodusa Telecommunications Services Inc	Telequality Communications Inc
Coinet	Md Communications	Telmex Usa Llc
Columbia Broadband Inc	Metropolitan Telecommunications Of Oregon - Dba Mettel	Telrite Corporation
Comcast Phone Of Oregon Llc	Midcolumbia.Net	Teltrust Corporation
Commpartners Llc	Midvale Telephone Exchange Inc	Threshold Communications Inc
Communications Network Billing Inc	Millenicom	Tillamook Lightwave
Comtech21, Llc	Miracle Communications	Time Warner Cable Llc
Comtel Telcom Assets Lp	Mitel Netsolutions, Inc.	Ton Services Inc
Consumer Telcom Inc	Mobilitie Llc	Total Call International Inc
Convergia Inc	Momentum Telecom Inc	Total Holdings Inc
Cooperative Communications Inc	Monroe Area Communications	Touchtone Communications Inc
Corban Technoligies, Inc.	Multiline Long Distance Inc	Trans National Communications International Inc
Cordia Communications Corp	My Tel Co Inc	Transpac Telecom Inc
Core Digital Services	National Access Long Distance Inc	Transunion Teledata Llc
Covista	National Brands, Inc.	Tribal One Broadband Technologies
Covista Inc	National Directory Assistance Llc	Tri-M Communications - Dba Tcm Communications
Ctc Communications Corp	Nationalcomtel	Tti National Inc
Cti Long Distance Inc	Nationwide Long Distance Service Inc	U S Telecom Long Distance Inc
Custom Teleconnect Inc	Navigator	Ucn Inc
Cypress Communications Operating Company Llc	Necc Telecom	United American Technology Inc
Dabney/Strawn Llc	Net One International Inc	United Communications Inc
Dct Telecom Group, Inc.	Net Talk.Com Inc	United Telecom Inc
Ddd Calling Inc	Netlojix Telecom Inc	Uni-Tel Communications Group Inc
Deltacom Inc	Network Billing Systems Llc	Utility Telephone Inc
Deltel Inc	Network Communications International Corp	Value-Added Communications, Inc.
Digizip.Com Inc	Network Enhanced Technologies Inc	Vanco Direct Usa Llc
Direct Communications Long Distance Inc	Network Operator Services	Vanco Us Llc
DISH	Network Service Billing Inc	Verizon Business Global Llc Dba Verizon Business
Dslnet Communications, Llc	Network Us Inc	Verizon Enterprise Solutions Llc
Easton Telecom Services Llc	Networkip Llc	Verizon Long Distance Llc
Electric Lightwave Llc	Neutral Tandem-Oregon Llc	Verizon Select Services Inc
Eltopia Communications, Llc	New Century Telecom Inc	Vidafon Inc
Encompass Communications Llc	New Horizons Communications Corp	Voicecom Telecommunications Llc
Enhanced Communications Group Llc	Newpath Networks Llc	WCS Wireless License Subsidiary LLC (NextWave Wireless Inc.)

Enhanced Communications Network	Nextlink Wireless Inc	Western Independent Networks Inc
Entrix Telecom Inc	Nexus Communications Inc Dba Nexus-Tsi	Wholesale Carrier Services Inc
Ernest Communications Inc	Nexustel Llc	Willamette University
Eschelon Telecom Of Oregon Inc	Nitel	Wiltel Communications Llc
Evercom Systems, Inc.	Noble Creek Communications	Windstream Communications Inc
Extenet Systems	Nobeltel, Llc	Windwave Technologies, Inc.
Ezwireless	Norlight, Inc.	Wired Or Wireless Inc
Fiber South Consortium	Norstar Telecommunications Llc	Working Assets Funding Service Inc
Fiberlink Llc	North County Communications Corporation Of Oregon	World Communications Inc
First Choice Technology Inc	Northstar Telecom Inc	Worldnet Communication Services Inc
First Communications Llc	Northwest Open Access Network	X2comm Inc
Flatel Inc	Nos Communications Inc	X5 PDX, LLC
Forestel,Llc	Nosva Limited Partnership	XO Communications Services, Inc. (Affiliated Entity)
France Telecom Corporate Solutions, Llc	Ols Inc	Yestel Usa Inc
	One Economy	Ymax Communications Corp
		Zeus Telecommunications Llc

DATA DEVELOPMENT & VALIDATION METHODOLOGIES WHITE PAPER

Commonwealth of Pennsylvania
State Broadband Initiative (SBI)
Broadband Mapping Project

NTIA Data Submittal
April 1, 2013

Baker

Table of Contents

Introduction

The following sections of this document provide an overview of the process used for the SBI Broadband Mapping data development for the Commonwealth of Pennsylvania. The following narrative is depicted in Appendix A, Commonwealth of Pennsylvania SBI Process Workflow, and Appendix B, State Broadband Data Validation Workflow, included at the end of this document.

Broadband Provider Outreach Results

As a result of the outreach to broadband providers and investigating whether an internet service provider (ISP) fits the definition of a broadband provider as per the NOFA, the following is a summary of our findings:

288 Total Investigated ISPs
114 Total Confirmed Broadband Service Providers (unique Provider/DBAs combinations)
94 Broadband Service Providers who Supplied Data (unique Provider/DBAs combinations)
26 Total Confirmed Broadband Service Resellers
4 Broadband Service Resellers who Supplied Data

Attachment C, Master Outreach List, contains additional provider information.

Broadband Provider Outreach Procedure

The following outreach procedure provides the framework for communicating with Broadband Service Providers (providers). The primary goals of the outreach approach documented herein are to:

Promote provider understanding and acceptance of the Broadband Mapping process, results, and benefits
Clarify NTIA Broadband Mapping requirements
Facilitate data confidentiality agreements as required
Minimize the submittal of invalid data
Enhance provider understanding of the semi-annual update process
Work with providers to evaluate submittal options to facilitate data submittals

Data Submission Guidelines

Guidelines for the providers' submission of Broadband Mapping Data are documented in the "Data Submission Guidelines". These Guidelines define technical requirements, submission specifications, and coordination and documentation activities.

Pennsylvania Broadband Providers Website

A URL was deployed (http://www.bakergis.com/PABroadbandProvider/) to communicate and distribute NTIA NOFA requirements to providers along with outreach and data submittal materials including:

NTIA NOFA and subsequent clarification
Outreach letters to providers
Draft Non-Disclosure/Data Sharing Agreement
Quick Start Guides

Data Submission Guidelines
Data Transmittal Letter
Broadband Data Submittal Templates
Census TIGER Data
Data Submittal Assistance Contact Information

Outreach Delivery Vehicles

A State Broadband Mapping Initiative Call for Data letter from the Commonwealth of Pennsylvania Department of Community and Economic Development (DCED) was emailed to all providers in the Commonwealth. This initial provider contact letter described the program and the role of Michael Baker Jr., Inc. (Baker) acting on behalf of the DCED for Broadband Data Collection and Mapping.

Baker distributed a follow-up letter to all providers describing the data submittal requirements and material and help available to aid with the data submittals.

Submittal assistance was provided to providers that needed help with data submittals.

Presentations were conducted with various broadband provider associations to present the data submittal requirements and answer questions.

Email communication and electronic transfer of data was encouraged to facilitate a faster delivery of data and information.

A URL was deployed and promoted to distribute outreach material and information concerning the Broadband Mapping Project.

A secure FTP URL was provided for submittal of broadband data by providers.

A secure Broadband Provider Data Update Webportal was deployed for providers to redline/update their service coverage, rather than supply their updated coverage for the semi-annual data updates.

Inclusion of Resellers

With the request for data current as of December 31, 2011, resellers are being included in all of the outreach, data collection, data aggregation, and verification tasks. The following outreach form has been developed to secure the proper information and to minimize the resource commitment required by the reseller.

BROADBAND SERVICE PROVIDER INFORMATION					
****Please fill out one form per DBA and / or Technology of Transmission****					
Provider Name:					
Doing Business As (DBA) Name (if applicable):					
FCC Registration Number (FRN) (if applicable):					
Website Address:					
Do you own transmission equipment, including middle mile, for your service area or for any part? *(Termed 'Broadband Primary Provider' in FAQ's)*	☐	Yes	☐	No	
If you answered Yes, please indicate this coverage area by county, municipality, or zip code and a map will be provided for you to further define your coverage area.					
If you answered No, please indicate the Carriers you contract with to provide your company's broadband coverage. *(Termed 'Broadband Reseller' in FAQ's)*					
Do you resell broadband services for the entire area of each carrier above?	☐	Yes	☐	No	
If No, then please indicate your reseller coverage area(s) by county, municipality, or zip codes and a map will be provided for you to further define your reseller coverage area:					
Technology of Transmission: *(one per form)*					
☐	Asymmetric xDSL (ADSL)	☐	Symmetric xDSL (SDSL)		
☐	Cable Modem - DOCSIS 3.0	☐	Other Copper Wireline		
☐	Cable Modem - Other	☐	Optical Carrier / Fiber to the End User		
☐	Terrestrial Fixed Wireless - Unlicensed	☐	Terrestrial Fixed Wireless - Licensed		
☐	Terrestrial Mobile Wireless	☐	Electric Power Line		
☐	Satellite	☐	Other		
Speed Tiers: *What is the **Maximum** Broadband advertised speed ?*					
Maximum Advertised Downstream Speed	☐	Greater than 768 kbps and less than 1.5 mbps			
	☐	Greater than 1.5 mbps and less than 3 mbps			
	☐	Greater than 3 mbps and less than 6 mbps			
	☐	Greater than 6 mbps and less than 10 mbps			
	☐	Greater than 10 mbps and less than 25 mbps			
	☐	Greater than 25 mbps and less than 50 mbps			
	☐	Greater than 50 mbps and less than 100 mbps			
	☐	Greater than 100 mbps and less than 1 gbps			
	☐	Greater than or equal to 1 gbps			
Maximum Advertised Upstream Speed	☐	Less than or equal to 200 kbps			
	☐	Greater than 200 kbps and less than 768 kbps			
	☐	Greater than 768 kbps and less than 1.5 mbps			
	☐	Greater than 1.5 mbps and less than 3 mbps			
	☐	Greater than 3 mbps and less than 6 mbps			
	☐	Greater than 6 mbps and less than 10 mbps			
	☐	Greater than 10 mbps and less than 25 mbps			
	☐	Greater than 25 mbps and less than 50 mbps			
	☐	Greater than 50 mbps and less than 100 mbps			
	☐	Greater than 100 mbps and less than 1 gbps			
	☐	Greater than or equal to 1 gbps			

Figure 1 Reseller Outreach/Interview Form

Secure Broadband Provider Data Update Webportal

A secure web-based application for broadband service providers has been deployed to simplify and automate the semi-annual process for collecting and verifying data. The webportal provides an easy-to-use map redlining tool for updating a provider broadband service area and attributes. It is expected that the simplification and automation of the data collection process will increase participation and improve the timeliness of provider response, data accuracy and consistency. Providers are being encouraged to utilize this tool but data is still being accepted through other means and formats.

Figure 2 Provider Data Update Webportal Entry Page

The View/Edit Coverage Map functions via secure login/password and secured map services limit broadband providers to see and edit only their own data. Picklists of valid database attributes eliminates entry errors and create consistency. It also contains a workflow from initial provider input, saving of a provider's work-in-progress, provider formally submitting edits, aggregation into the master geodatabase, soliciting provider approval of aggregated data, and final approval of the edit.

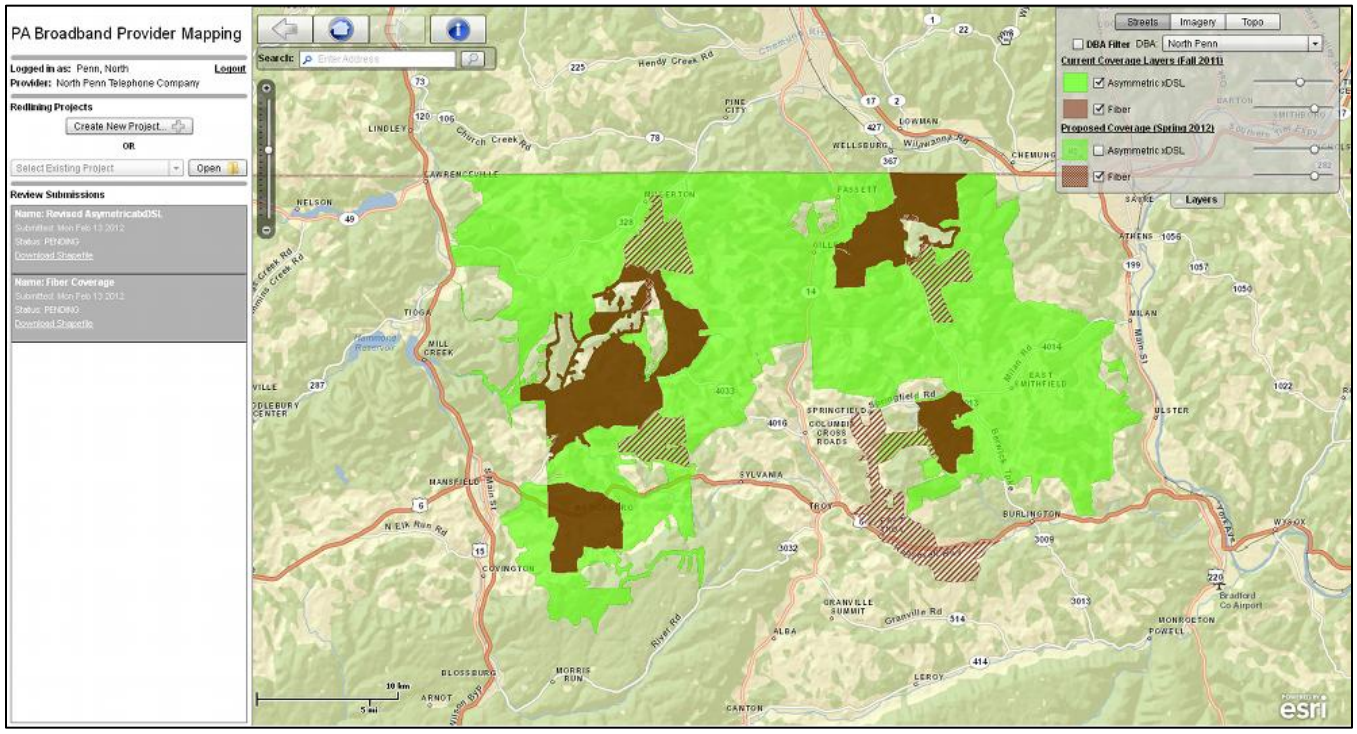


Figure 3 Provider Data Update Webportal –View/Edit Coverage Map Environment

Broadband Outreach Tracker Application

The Tracker application is utilized to collect all correspondence with providers and feedback on the effectiveness of the outreach activities by tracking items such as:

The number and content of incoming e-mails and letters submitted from the providers

The number and source of comments, questions, and suggestions made by providers

The number and source of comments, questions, and suggestions made by attendees at provider meetings and conference calls

Provider contact information and data submittal status.

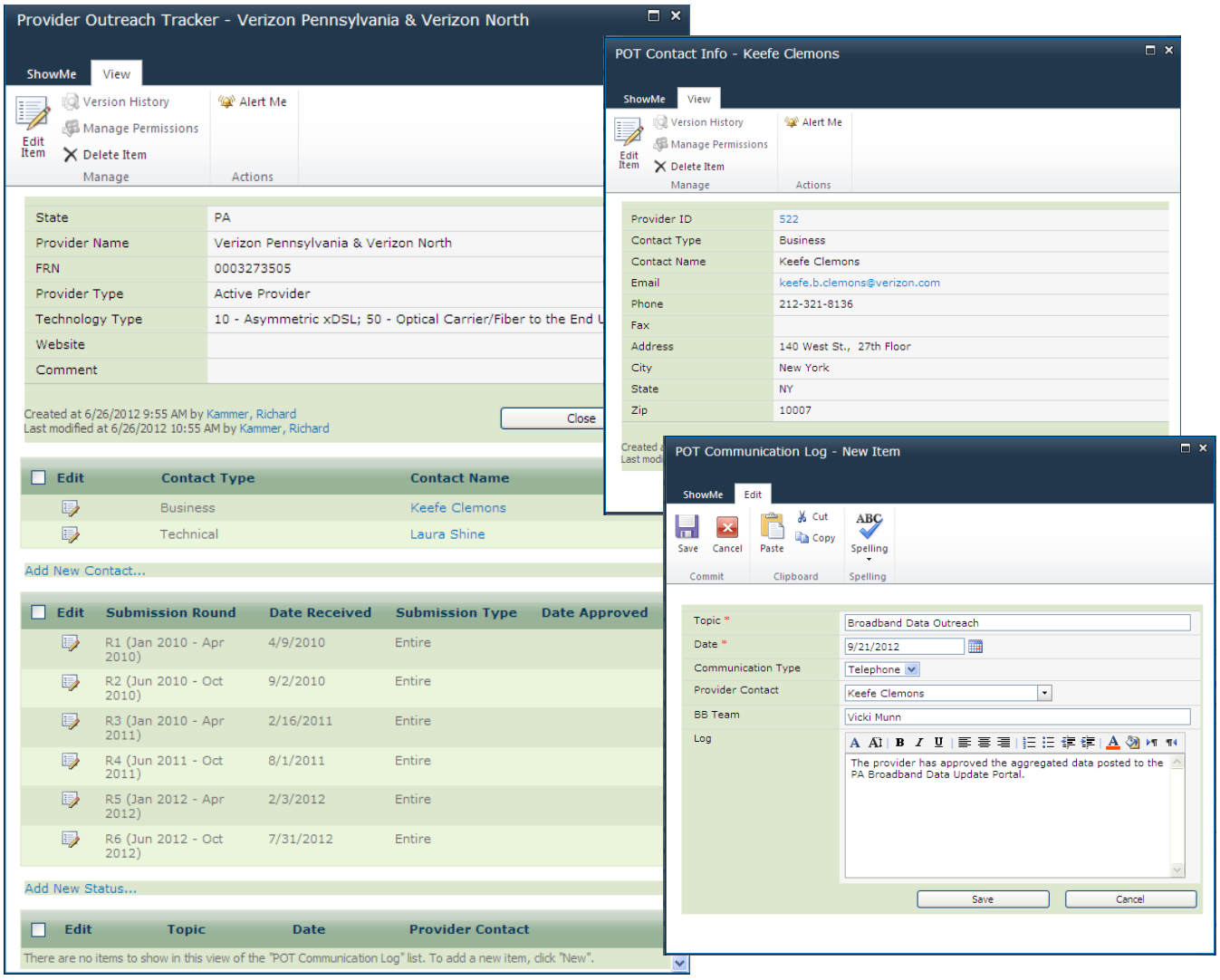


Figure 4 Broadband Outreach Tracker

Provider Submittal Validation

When a data submittal is received from a broadband service provider, it is updated in the Broadband Outreach Tracker and run through an initial validation process to assure that it meets the submittal guidelines.

Validation Checklist

The following items are part of this initial data validation process:

Verify provider's transmittal letter requested in Data Submission Guideline with is complete and matches submitted data

Verify the file naming conventions

Verify each file is machine readable

Verify data is in the correct GIS or Tabular format/file type

Verify each field is populated and no empty or NULL values are present for mandatory fields

Verify all ID (record number points) are unique within the submittal

Verify all attribute data is formatted according to the submittal guidelines
Verify topology for all geospatial submissions
Verify Metadata for all submissions
Verify the required contact information is included
Verify adherence to Data Submittal Guidelines (see http://www.bakergis.com/PABroadbandProvider/ to access Data Submittal Guidelines)
Broadband Service Availability (at least one)
Individual Street Addresses (Sec 3.1 & 4.1)
Census Blocks < 2 sq mi (Sec 3.3 & 4.3)
Street Segments for Census Blocks > 2 sq mi (Sec 3.2 & 4.2)
Service Overview (Sec 3.4 & 4.4)
Polygonal Boundary Area(s) (Sec 3.8 & 4.8)
Middle-mile Points (Sec 3.5 & 4.5)
Community Anchor Institutions (Sec 3.7 & 4.7)
Last Mile Connection Points (Sec 3.6 & 4.6)
WISP Antennas (Sec 4.9)

Data Usability Determination

The validation results are evaluated by the outreach and aggregation persons to determine the usability of the data. If the data meets the submission specifications, it is forwarded on for data aggregation. If it is determined to be unusable, it is returned to the provider for resolution. If the data can be manipulated to get it into a usable format, it is manipulated as required, and then forwarded on for data aggregation.

SBI Data Development

Data from the providers may be submitted in various formats as defined in the Data Submittal Guidelines, or in some cases unspecified formats may be accepted to help facilitate provider participation. Depending on the format of the submitted data, it is processed through one of the following processes to upgrade it to the NTIA SBI data standards.

Spatial Data

After validation and any required manipulation of any spatial data submitted by the providers, it is georeferenced and simply loaded into the appropriate NTIA geodatabase feature class.

Address Data Geocoding

If not already in the standard address point template, the provider tabular address data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. ArcGIS geocoding tools are then utilized geospatially locate the address points for the tabular records. Interactive address rematching is performed against two additional street centerline datasets as needed to increase geocoding matching results. The NTIA deliverable is the geocoded address point geodatabase table. The geocoded address points are also subsequently aggregated to the census block or road segment feature class for public web map display.

Census Block Aggregation

If not already in the standard census block template, the provider tabular census block data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. The provider tabular census block records are then joined to the geodatabase 2010 U.S. Census Block. This join is performed as many times as necessary for multiple Trans Tech values for each Provider/Census Block combination. The NTIA deliverable is the census block geodatabase table.

If the list of census blocks contains blocks > 2 sq. miles then these blocks are used to select all the 2010 U.S. Census TIGER centerlines that intersect those blocks. The Census Block record data is aggregated to each Road Segment within the Census Block. This process is performed as many times as necessary for multiple Trans Tech values for each Provider/Census Block combination.

Road Segment Aggregation

If not already in the standard road segment template, the provider road segment data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. If the provider submittal included graphic centerline segments, these are migrated into the delivery geodatabase along with the linked attribute records. If the provider submittal was tabular road segment records only, they are then joined to the geodatabase 2010 U.S. Census TIGER centerline feature class. This join is performed as many times as necessary for multiple Trans Tech values for each Provider/Road Segment combination. The NTIA deliverable is the road segment geodatabase table.

If the provider road segment data lie within census blocks <= 2 sq. miles then the road segment data is aggregated to the census block. This process is performed as many times as necessary for multiple Trans Tech values for each Provider/Road Segment combination. The NTIA deliverable is the road segment geodatabase table.

Overview Data Aggregation

Provider Service Availability Areas submitted for entire county areas are loaded into the NTIA geodatabase Overview table. If not already in the standard template, the provider data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. The provider overview records are then joined to the geodatabase 2010 U.S. Census County feature class. This join is performed as many times as necessary for multiple Trans Tech values for each Provider/County Area combination.

Polygonal Boundary Aggregation/Integration

Providers submitting polygonal service area data are handled in two ways. Wireline Provider data is aggregated to the census block feature class for areas where census blocks <= 2 sq. mi., or road segment feature class for areas where census blocks > 2 sq. mi. Wireless Provider Service Availability Areas submitted by polygonal area are simply loaded into the NTIA geodatabase Poly_Bndry feature class.

Wireline Provider

The polygonal data is georeferenced and loaded into the Poly_Bndry feature class. The polygon is then attributed, manually if necessary. Depending on the area, census blocks < or => 2 sq. mi., a selection set of either

census blocks or road segments that intersect the polygon boundary is created. The attributed polygon boundary is then joined with census blocks or road segments table to attribute accordingly. This join is performed as many times as necessary for multiple Trans Tech values for each Provider/County Area combination. The NTIA deliverable is the census block or road segment geodatabase table.

Wireless Provider

The polygonal data is georeferenced and loaded into the Poly_Bndry feature class. The polygon is then attributed, manually if necessary. Multiple Poly_Bndry records are created for multiple Trans Tech values for each provider. The NTIA deliverable is the polygon boundary geodatabase table.

Middle/Last Mile Data Integration

If not already in the standard template, the data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. The point features are geo-located utilizing the lat/long information provided. The NTIA deliverable is the middle or last mile geodatabase table.

Community Anchor Institution Integration

Providers supplied some Community Anchor Institution (CAI) data with the data submittals. But the majority of the data was collected from existing GIS Layers maintained by the Commonwealth of Pennsylvania, outreaching to CAIs through state agencies and their contacts, and having CAIs complete an online survey at http://www.bakerbb.com/pa_institution_survey/.

Provider CAIs

If not already in the standard template, the data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. The point features are geo-located utilizing the lat/long information provided. Address data is used to geocode locations only when lat/long data is not provided.

Commonwealth CAIs

CAI shapefiles were provided through the Commonwealth's other geospatial efforts. The shapefiles were then exported to the NTIA geodatabase CAI feature class. Various sources for obtaining broadband information for the CAIs were utilized. Various state agencies provided some of the information, i.e. Pennsylvania Department of Education (PDE) provided tabular broadband information for schools, PDE provided tabular broadband information for libraries, and Pennsylvania State Police provided tabular broadband information for their facilities. A CAI data survey website was also deployed and the URL distributed by various state agencies to the CAI contacts. Data from all of these sources were then aggregated into the CAI geodatabase table for the NTIA deliverable.

USAC –CAI Web Scraping

To enhance the CAI inventory, a web scraping tool has been developed to automatically query the USAC public website, http://www.slforms.universalservice.org/DRT/Default.aspx, in a batch mode and extract school and library CAI data for Pennsylvania. This extracted information supplements the CAI data collected by the other methods.

Typical Speeds from Other Sources

Because not all providers are submitting the typical speed attribution with their data, a method to fill in the missing information has been developed using other sources. The method utilizes speed test data supplied through the FCC speed test information as well as from other speed test data that we are independently collecting. Business rules have been established so quality and realistic typical speeds are produced. The end result is a more complete data submittal to NTIA.

Propagation Modeling

Fixed wireless broadband transmission is a diverse technology. Service may be transmitted over licensed and unlicensed spectrum, and delivered by larger corporate or smaller LLC business entities, many of which serve rural areas of the State. This diversity has resulted in varying levels of SBI participation including Providers that have:

participated,

refused to participate,

wished to participate but lack adequate capabilities and/or tools, or

supplied data of marginal accuracy

The NTIA's supplemental grant funding has provided the means to generate propagation models to supplement and validate the above scenarios. In addition, the NTIA has identified fixed wireless service coverages with unusual shapes for state grantee analysis.

To facilitate development of propagation mapping, additional tower/antenna information is being requested from fixed wireless broadband providers. For those providers not responding to requests for required tower/antenna information, an attempt is made to gather the information through 3rd party sources and field investigation. The Provider, 3rd party and/or field data is processed using Terrain Analysis Package (TAP) software to develop propagation models. Maps of the resultant propagation study are sent to the fixed wireless providers for their feedback on the propagation model produced for their company.

Data Verification Summary

Pennsylvania's broadband mapping project employs a multi-prong approach to ensure the provider data is accurate and complete.

In summary, the project employs the following validation methodologies and resources:

Provider Validation
Data Validation via Market Intelligence Sources
Data Validation Using State Supplied Data Points
Field Validation
Wireless Coverage Analysis
Topology Validation
Automated Validation Processing
Confidence Level/Statistical Modeling

SBDD Check Submission
Stakeholder Validation

The remainder of this verification section describes the various methods in greater detail.

Provider Validation

After data development, service availability maps are generated and submitted to the providers to validate their mapping results. This provides a "sign off" on the interpretation of the submitted data and extends the outreach efforts by providing a visual representation of the data to be delivered to the State and the NTIA.

Types of Provider Maps

Provider maps generally consist of the following types.

Outreach Maps

Often, providers will send data which does not contain all the information needed for a NTIA compliant dataset. In such cases, as an aid to the outreach communication, it may be necessary to produce a map to help the provider locate their service area or verify data they have provided. These maps may take many forms, but generally are of two types:

General Location Maps – these maps are often produced when the provider does not have a list of address or other standard submittal data and needs help defining their service area. A typical map will show counties, major roads, and towns of the general area the provider has stated as their service area. The intent of the map is to give the provider a way to markup or delineate their service area. If a provider has not provided required attribute information such as Technology of Transmission, Speed Data, etc. then it may be necessary to add a visual clue to this data like an information stamp on the map that they can easily fill out. If the provider sends the map back with a service area boundary, this can then be digitized and sent back to the provider for verification.

Verification of Provider Supplied Boundaries – these maps are produced when the provider has sent service area boundary information which is confusing or otherwise unclear. Often these are produced when providers send CAD maps, hand drawn maps that need digitization, or lists of zip codes or counties served. A typical map will place the interpreted boundary over a location map so the provider can verify the service area. As with the General Location Map, information stamps or other visual clues may be placed on the map.

Initial Verification Maps

Once the provider data has been processed and the census block and road segment feature classes created, an Initial Verification Map (Figure 5) is produced to give the provider a visual representation of their service area by census block. These maps enable the provider to verify their service area and make changes if necessary. Initial Verification Maps are produced using a set of standards and produced at the highest resolution necessary to convey the map information to the provider. Initial Verification Maps are also produced for Wireless Polygon areas.

Detailed Verification Maps

Providers who have questions about their service areas may request additional information to help clarify issues. In these cases, it may be necessary to create a Detailed Verification Map to highlight the areas in question. Detailed Verification Maps provide the same information as Initial Verification Maps only at a higher resolution. Several maps may be needed to accurately portray an area in question.

Revised Maps

Revised maps take two forms:

Initial or Detailed Verification Maps which have been annotated or marked-up by the provider
Outreach produced Initial or Detailed Verification Maps incorporating provider changes

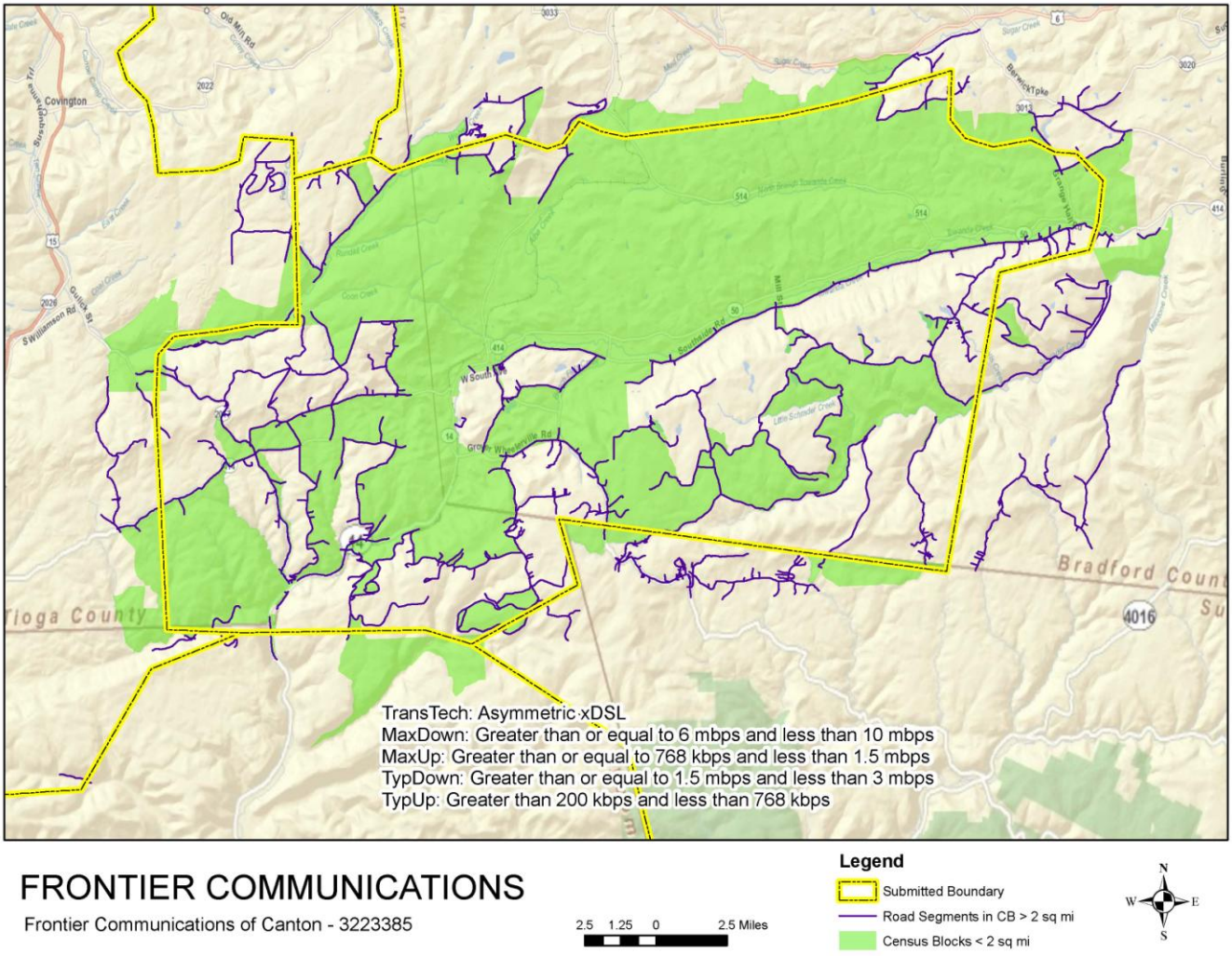


Figure 5 Provider Map

Data Validation

A critical component of the project is the validation of the data submitted by the broadband service providers. Data from various sources, as described in more detail in the following sections, is utilized to develop a level of confidence in the data received from the broadband providers.

Validation Data Set Collection and Development

This validation process employs data sets developed or acquired from different sources as described in the following sections.

Provider Feedback Loop: Maps of completed provider service areas and data are furnished back to the providers for confirmation of the processed/aggregated information. Feedback is integrated into the each provider's dataset.

Telogical Systems Wireline Market Intelligence Data: This commercially available dataset was developed using a methodology that incorporates deep web crawling and additional means, including direct mail harvesting and advertising collaterals (including door to door) to gather cable and telecommunication provider information. This dataset is used as a validation source for wireline provider service area coverage, Technology of Transmission, and Speed.

American Roamer Wireless Market Intelligence Data: This commercially available dataset is used as an independent source to verify information submitted by providers of wireless broadband service. This dataset is used as a validation source for wireless provider service area coverage.

Prior Commonwealth Broadband Mapping Dataset: Under the requirements of the Commonwealth's Act 183 of 2004 legislation, broadband coverage data was previously collected by the Commonwealth. These datasets are used as a validation source for provider service area coverage and Technology of Transmission.

FCC Speed Test: The FCC speed test data includes the IP addresses for each specific speed test conducted. This IP address is queried against a web search engine to determine the provider assigned to that address and is used as a validation source for the provider service coverage and typical speeds.

Fixed Wireless Line of Sight Analysis: Utilizing the existing PAMAP LiDAR for topography generation and determining tower/antennae heights, line of sight analysis is performed to determine areas of reported fixed wireless broadband coverage that is questionable.

Field Data Acquisition: Broadband technicians visited a sampling of census block locations to gather broadband data to be used for validation. The following criteria were taken into account when developing the census block sampling dataset:

urban vs. rural census block characteristic
censes block grouping
land vs. water census block characteristic

The overarching mission of the Federal broadband stimulus program is to expand Broadband service to areas that are currently unserved and underserved. Also, the market intelligence validation sources typically represent

some rural, but more urban areas. Thus, our field data collection efforts were targeted more towards the rural areas; split 90% rural, 10% urban.

Additionally, a study by Penn State University (Glasmeier 2002) notes that a large number of census block groups typically fit within any given cable or telephone company service areas. Therefore, our field sample was also based on selection of one census block per block group and a land mass greater than 50% to avoid field visiting areas covered mostly by water. There are a total of 10,387 block groups in PA. Using a statistical sample size calculator based upon the number of block groups in the state and +/- 4% margin of error at a 95% confidence level, the sample size is 568 census block locations statewide. The procedure for selecting the calculated field verification census blocks is provided below.

Select one census block per census block group
Convert the census block groups polygon to label points.
Select the census block polygon by doing a spatial selection using census block groups label points.
Select from the current selection where the census block land mass is 50% or greater and the block is rural.
Export the selected blocks to a new shapefile. This reset the FID for the next step.
Select every 2nd, 3rd, 4th, or so on to get the desired number of blocks. Query used to select: MOD("FID",2) = 0. This will select every other record.

The planned census block field locations are shown in Figure 6.

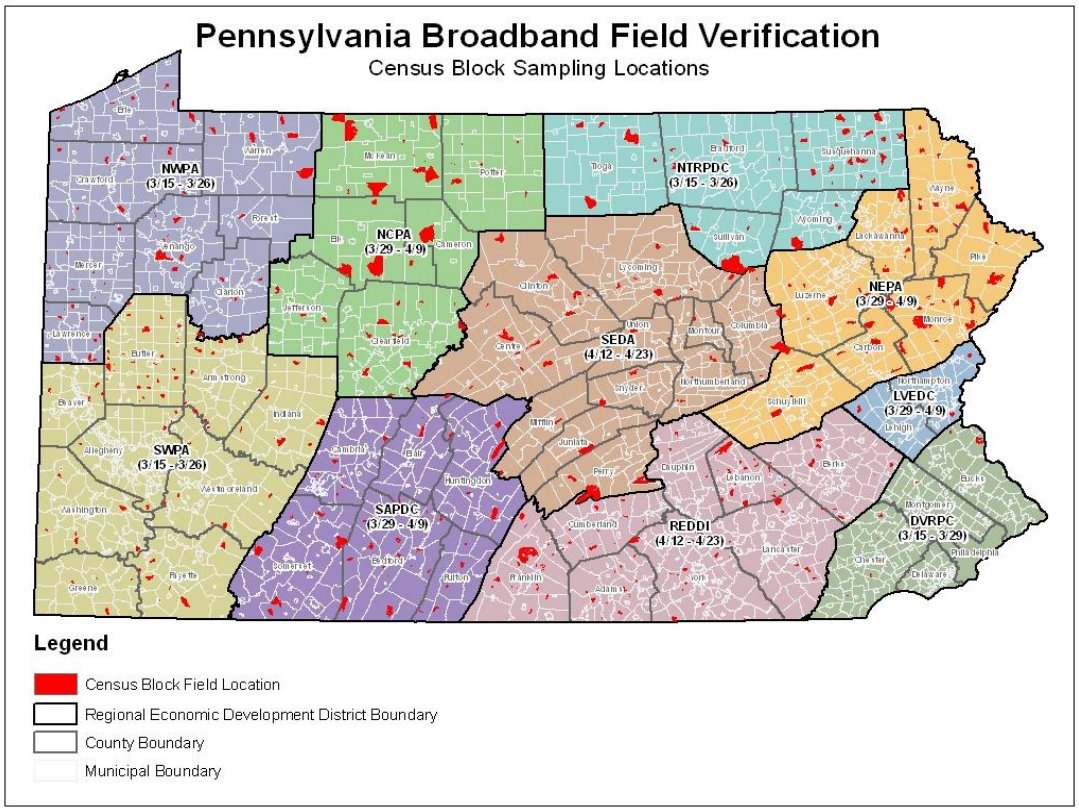


Figure 6 Planned Field Verification Census Block Locations

For each census block in the sample set, broadband technicians collected data using Panasonic Toughbook computers, loaded with MapPoint mapping software, and a customized Microsoft Access data collection form with the ability to automatically import GPS coordinates. The sample census blocks were pre-loaded and directly accessible from MapPoint. Two types of data collection were conducted (infrastructure observation and wireless speed testing) and the results were recorded and linked to the corresponding field location coordinates within the designated sample census block. The information collected by the field broadband technicians includes:

Wireline:

GPS coordinates
circuit infrastructure feeding the area (copper, fiber, cable)
local distribution hut equipment inspection, where allowed/possible
witness access circuit speed tests, where allowed/possible
facility elevation (measurement relative to grade), where allowed/possible
distance from DSLAM measurement where applicable and determine access speed capability with an accuracy within 500ft using mapping software
collect site pictures

Wireless:

GPS coordinates
internet speed test

The map in Figure 7 shows the locations (blue points) of the census block field surveys that were performed.

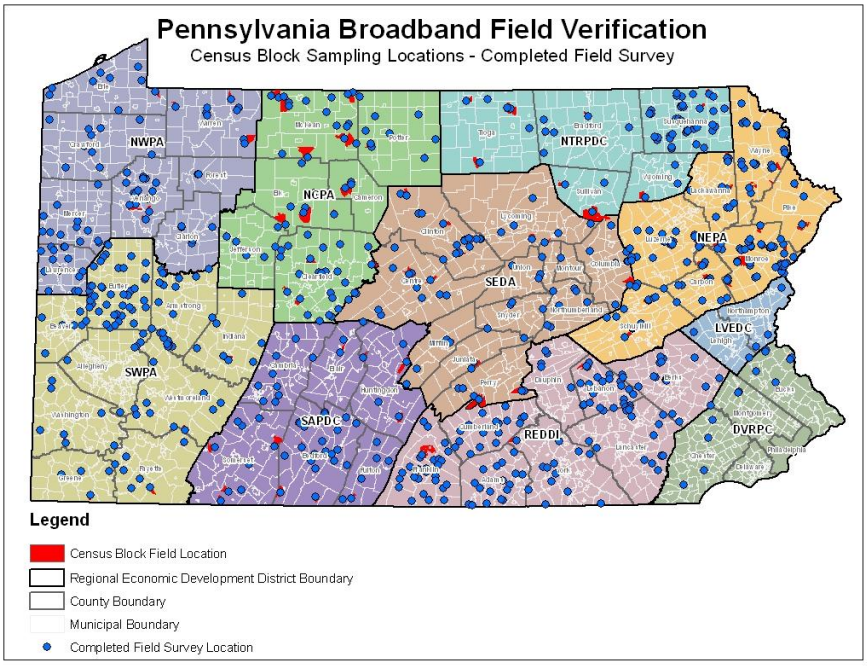


Figure 7 Completed Field Verification Locations

For the 568 census blocks that were visited, 2821 individual wired/wireless data elements were recorded and 3666 pictures were taken at those locations. This field collected dataset is used as a validation source primarily for wireline and wireless technology of transmission, middle mile, and wireless speed.

Provider Data Validation Process

Provider Feedback Loop: Feedback received from the providers is visually inspected and integrated directly in the mapping GIS database.

Service Area Validation Data: The Telogical wireline service area data is tabular and contains a separate record for each provider/technology of transmission combination with an associated census block or TIGER road segment, depending on the whether the size of the census block area (=/< or > 2 sq. mi.). This data is exported into an ArcGIS data format. The American Roamer wireless service area data is already in and ArcGIS data format. The validation data is then joined to the provider service area data by census block or TIGER road segment ID. Any database records in the provider or validation tables that cannot be joined are output to a separate layer that indicates the areas of discrepancy between the two datasets. The joined tables are then queried to detect any speed discrepancies which are also output to a separate discrepancy layer.

Topology: The ArcGIS Validate Topology Tool is used to flag any topology issues in the broadband data. Flagged issues are reviewed to identify false positives and update true errors as required.

SBI Check Submission: The NTIA-provided SBI Check Submission tool is utilized to validate that the deliverable broadband data is consistent with the business logic rules set forth by the NTIA and a passing receipt is provided with the data submittal to NTIA.

Stakeholder Feedback: The state broadband mapping website includes a feedback function. Comments received from stakeholders such as the regional Economic Development Districts and the public are reviewed and used to validate the provider data submissions.

Validation and Confidence Level Reporting

To facilitate validation and confidence level reporting, Baker deployed a validation application called Statistical Evaluation and Assessment System (SEAS) which automatically compares the multiple independent validation datasets against the broadband service providers' supplied information. The SEAS application uses statistical methodologies to report the confidence level in the spatial and attribute accuracy of the information. Appendix B shows the validation workflow.

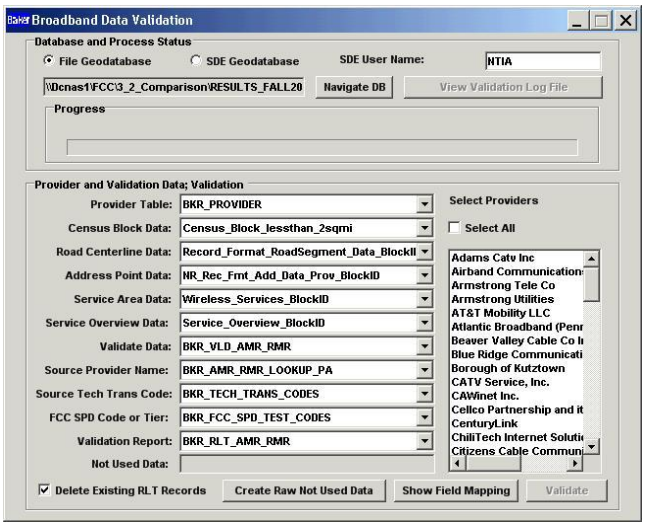


Figure 8 SEAS

The SEAS comparison is a three-part validation process:

Comparison of the collected validation source against

the aggregated broadband provider data.
Match percentage calculation for each provider reported in the DataPackage.xls, "Provider Table" tab, "Comments" column.
Confidence score calculation displayed on the state broadband website.

After completing all validation data source collections, SEAS is used to automatically compare the multiple validation datasets against the aggregated broadband data which came from the providers. Through the SEAS accumulation table, it produces a match percentage per broadband service record based upon the number of matches that record has against each validation source. The matched percentage for each record is the result of the total count of the matched validations for the record divided by the total validation source being compared against the record. Validation confidence rating/score is assigned on a scale of 1 to 5 based upon the percentage of validation source matches as per the following score results:

1 Star = 0% - 19% Match
2 Stars = 20% - 39% Match
3 Stars = 40% - 59% Match
4 Stars = 60% = 79% Match
5 Stars = 80% - 100% Match
"No Analytics" = No validation source available for that provider

The Commonwealth's public broadband mapping website (www.broadbandinpa.com) is updated with the confidence level results at the record level based upon the queried geographic location and the following shows an example of this representation.

Provider Name	Transmission Technology	Max Download Speed	Max Upload Speed	Confidence Score
AT&T Mobility	Mobile Wireless	Greater than or e…	Greater than or e…	★★★☆☆
Verizon	Asymmetric xDSL	Greater than or e…	Greater than or e…	NO ANALYTICS
Comcast	Cable Modem – Other	Greater than or e…	Greater than or e…	★★★★☆

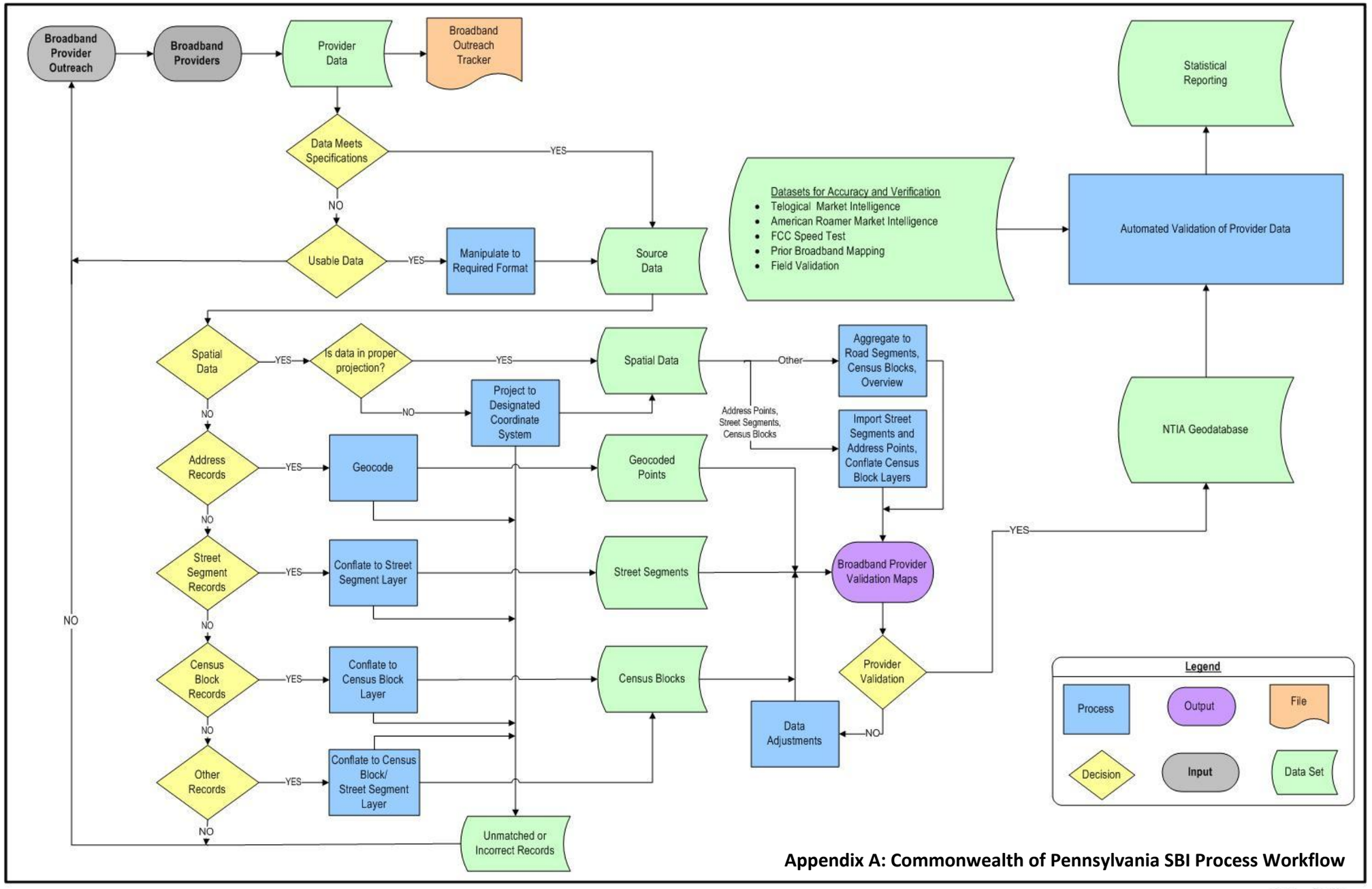
The matched percentage for the records for each provider are summarized and then divided by the total count of the records to create the final matched percentage for the specific provider. These percentages are included in DataPackage.xls on the Provider Table tab in the Comments column.

Low Confidence Provider Feedback

Provider data which is assigned a low confidence (1 or 2 stars) through the SEAS process is communicated back to the provider through a feedback loop. Generally, the low confidence feedback and reconciliation is a continuous refinement process and usually occurs between update cycles. The goal is to provide this feedback through the Provider Data Update Webportal via a web connection that is available and rolled out to providers in January 2012.

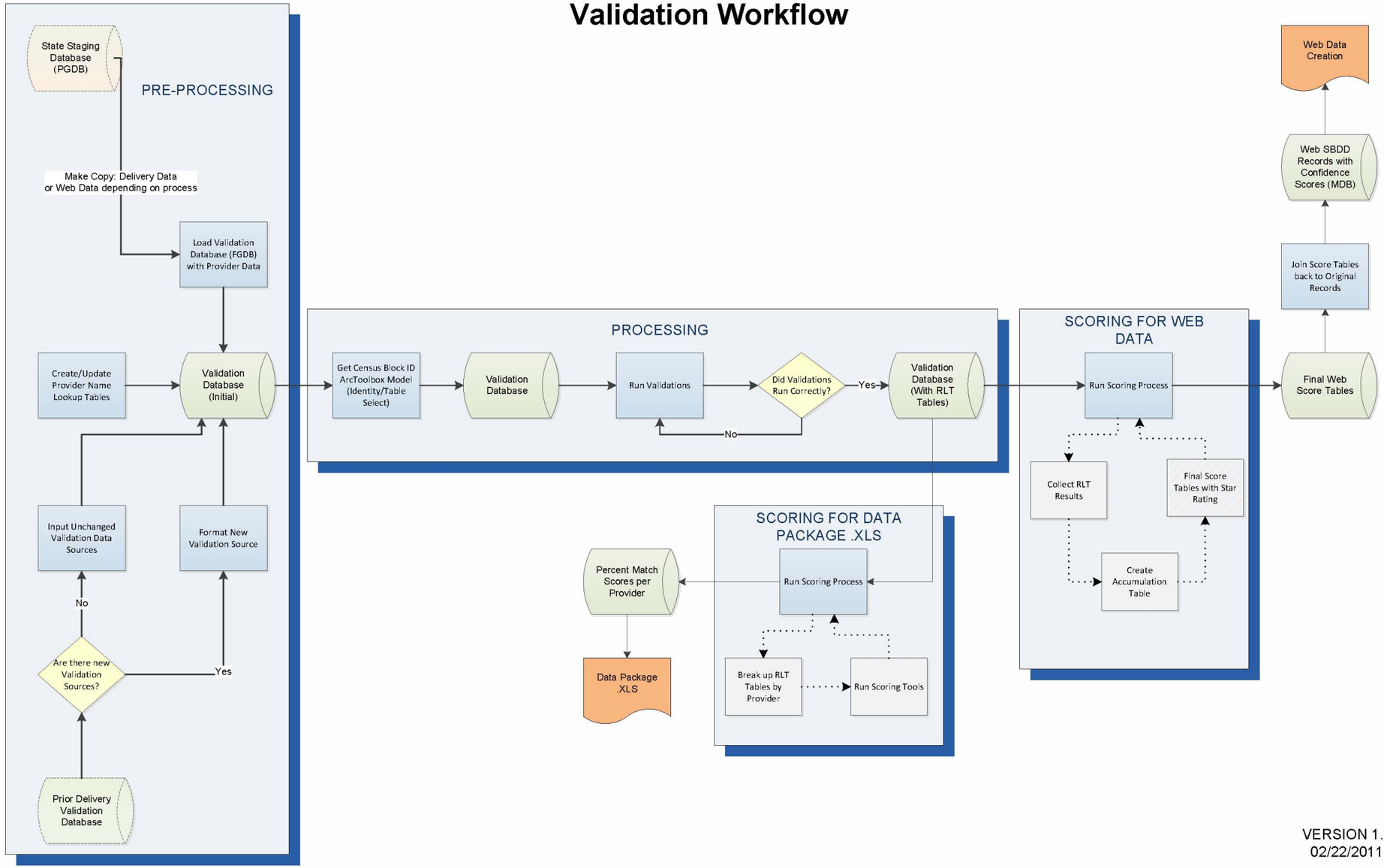
Changes and Corrections Documentation

With each semi-annual NTIA data submittal, changes and corrections documentation is provided. Significant changes in a provider's status or data, corrections to previously supplied data, providers supplying data for the first time, etc. are specified by Provider name in the Changes and Corrections document.



Appendix A: Commonwealth of Pennsylvania SBI Process Workflow

Appendix B: State Broadband Data Validation Workflow



VERSION 1.1
02/22/2011

Appendix C: Master Outreach List

Filling Combany DBA	Filling Company Name	Status
1USA.COM	1USA.COM	Not a Broadband Provider or Reseller
21st Century Resoration & SLS		Not a Broadband Provider or Reseller
2s Graphic Design Inc.		Not a Broadband Provider or Reseller
A P Wireless		Not a Broadband Provider or Reseller
AboveNet	AboveNet	Not a Broadband Provider or Reseller
Access Northeast	Access Northeast	Not a Broadband Provider or Reseller
Advanced Mobile Group		Not a Broadband Provider or Reseller
AllCoNet		Not a Broadband Provider or Reseller
Alteva Communications	Alteva Communications	Not a Broadband Provider or Reseller
Altius Broadband	Altius Broadband	Not a Broadband Provider or Reseller
American Digital Online Services, Inc. (ADOS)		Not a Broadband Provider or Reseller
American Telephone Company LLC	American Telephone Company LLC	Not a Broadband Provider or Reseller
Antietam Cable	Antietam Cable	Not a Broadband Provider or Reseller
Bandwidth.com		Not a Broadband Provider or Reseller
Broadband.com		Not a Broadband Provider or Reseller
Budget Prepay, Inc. D/B/A Budget Phone, Inc.		Not a Broadband Provider or Reseller
BullsEye Telecom, Inc.	BullsEye Telecom, Inc.	Not a Broadband Provider or Reseller
BurstNET		Not a Broadband Provider or Reseller
Buytelco, Inc.		Not a Broadband Provider or Reseller
Cablesat		Not a Broadband Provider or Reseller
Cavalier Telephone LLC	Cavalier Telephone LLC	Not a Broadband Provider or Reseller
Cellular One of NEPA (Northeast Pennsylvania)		Not a Broadband Provider or Reseller
Charter Internet		Not a Broadband Provider or Reseller
CIMCO Communications, Inc.	CIMCO Communications, Inc.	Not a Broadband Provider or Reseller
Cincinnati Bell Inc.		Not a Broadband Provider or Reseller
Citynet Holdings, LLC	Citynet Holdings, LLC	Not a Broadband Provider or Reseller
Clearview Partners	Clearview Partners	Not a Broadband Provider or Reseller
Community TV Systems Inc	Community TV Systems Inc	Not a Broadband Provider or Reseller
Computer Central	Computer Central	Not a Broadband Provider or Reseller
CONXX	CONXX	Not a Broadband Provider or Reseller
Cpudirect Networks, LLC	Cpudirect Networks, LLC	Not a Broadband Provider or Reseller
Delmarva T1		Not a Broadband Provider or Reseller
Detwiler Communications Inc	Detwiler Communications Inc	Not a Broadband Provider or Reseller
Digital Connections, Inc.		Not a Broadband Provider or Reseller
DISH	DISH	Not a Broadband Provider or Reseller

Filling Combany DBA	Filling Company Name	Status
DSLBroker.com		Not a Broadband Provider or Reseller
Dubois Communications Inc	Dubois Communications Inc	Not a Broadband Provider or Reseller
Ducom, Inc.	Ducom, Inc.	Not a Broadband Provider or Reseller
EA Media	EA Media	Not a Broadband Provider or Reseller
East Palestine Internet	East Palestine Internet	Not a Broadband Provider or Reseller
Eduro Networks, LLC	Eduro Networks, LLC	Not a Broadband Provider or Reseller
Entelegent Solutions, Inc.		Not a Broadband Provider or Reseller
Global Crossing North America, Inc	Global Crossing North America, Inc	Not a Broadband Provider or Reseller
Graybar Utility		Not a Broadband Provider or Reseller
Ground Control		Not a Broadband Provider or Reseller
Herr Cable	Herr Cable	Not a Broadband Provider or Reseller
Hotwire Communications, Ltd.	Hotwire Communications, Ltd.	Not a Broadband Provider or Reseller
Immix Wireless	Keystone Wireless, LLC	Not a Broadband Provider or Reseller
International Broadband Electric Communications, Inc. (IBEC, Inc)		Not a Broadband Provider or Reseller
Internet Communications Inc.		Not a Broadband Provider or Reseller
ISP 1		Not a Broadband Provider or Reseller
JB Cable	JB Cable	Not a Broadband Provider or Reseller
Leap Wireless International, Inc.	Leap Wireless International, Inc.	Not a Broadband Provider or Reseller
LightEdge Solutions, Inc.	LightEdge Solutions, Inc.	Not a Broadband Provider or Reseller
Line Systems, Inc.	Line Systems, Inc.	Not a Broadband Provider or Reseller
MediaFLO	Qualcomm	Not a Broadband Provider or Reseller
Metropolitan Telecommunications	Metropolitan Telecommunications	Not a Broadband Provider or Reseller
Milestone Communications Inc.	Milestone Communications Inc.	Not a Broadband Provider or Reseller
Millheim TV Transmission Company	Millheim TV Transmission Company	Not a Broadband Provider or Reseller
MTT First	MTT First	Not a Broadband Provider or Reseller
Near You Networks	Near You Networks	Not a Broadband Provider or Reseller
NEPAwireless	NEPAdate.com Ventures, LLC	Not a Broadband Provider or Reseller
One-Stop Communications of PA Inc.		Not a Broadband Provider or Reseller
OpenRange Communiciations	OpenRange Communiciations	Not a Broadband Provider or Reseller
Optical Telecommunications Inc.		Not a Broadband Provider or Reseller
PAETEC Communications, Inc.	PAETEC Communications, Inc.	Not a Broadband Provider or Reseller
PAOnline	PAOnline	Not a Broadband Provider or Reseller
PenTeleData Limited Partnership I	PenTeleData Limited Partnership I	Not a Broadband Provider or Reseller
Phoenix Cable Incorporated	Phoenix Cable Incorporated	Not a Broadband Provider or Reseller
PNG Telecommunications		Not a Broadband Provider or Reseller
Presque Isle Technology Solutions		Not a Broadband Provider or Reseller

Filling Combany DBA	Filling Company Name	Status
Qwest Communications Company, LLC	Qwest Communications International	Not a Broadband Provider or Reseller
RealLinx	RealLinx	Not a Broadband Provider or Reseller
Reliance Globalcom Services, Inc.	Reliance Globalcom Services, Inc.	Not a Broadband Provider or Reseller
Retel TV Cable	Retel TV Cable	Not a Broadband Provider or Reseller
SCR Online		Not a Broadband Provider or Reseller
Self Service America, discount ISP		Not a Broadband Provider or Reseller
SkywayUSA	Skyway	Not a Broadband Provider or Reseller
Snip Link LLC	Snip Link LLC	Not a Broadband Provider or Reseller
Somerfield Cable TV		Not a Broadband Provider or Reseller
Southside TV	Southside TV	Not a Broadband Provider or Reseller
Stage 2 Networks, LLC		Not a Broadband Provider or Reseller
Steel City Broadband		Not a Broadband Provider or Reseller
Sunset Net		Not a Broadband Provider or Reseller
Telovations, Inc.		Not a Broadband Provider or Reseller
tw telecom inc.	tw telecom inc.	Not a Broadband Provider or Reseller
TWR Communications		Not a Broadband Provider or Reseller
UHP Wireless Networks		Not a Broadband Provider or Reseller
USA Digital Communications		Not a Broadband Provider or Reseller
Valley Cable Systems	Valley Cable Systems	Not a Broadband Provider or Reseller
Ward Communications	Ward Communications	Not a Broadband Provider or Reseller
Westfield Community Antenna Assoc.	Westfield Community Antenna Assoc.	Not a Broadband Provider or Reseller
Whitefence		Not a Broadband Provider or Reseller
Wireless PA Internet Access	Wireless PA Internet Access	Not a Broadband Provider or Reseller
Xand		Not a Broadband Provider or Reseller
Zampelli Electronics	Zampelli Electronics	Not a Broadband Provider or Reseller
ACC Business	Affiliate of AT&T	Other
Fisk Internet Services, LLC	Affiliate of Getwireless.net, Inc.	Other
Jefferson County Cable	Affiliate of Blue Devil CAble TV, Inc.	Other
Pencor Services, Inc.	Affiliate of Blue Ridge Communications	Other
Prescient Worldwide		Other
Shentel	Affiliate of Sprint	Other
Susquehanna Communications	Affiliate of Comcast Cable Communications, LLC	Other
American Telecharge, Inc.		Potential
BCN Telecom, Inc.		Potential

Filling Combany DBA	Filling Company Name	Status
BetterWorld Telecom, LLC		Potential
Broadband Dynamics, LLC D/B/A Diversified		Potential
Broadband National		Potential
Broadstar, LLC		Potential
Broadview Networks Holdings, Inc.	Broadview Networks Holdings, Inc.	Potential
Broadvox		Potential
Business Automation Technologies, Inc. d/b/a Data Network Solutions		Potential
C Spire Wireless		Potential
Cambria Connected		Potential
Cooperative Communications, Inc.		Potential
Country Cable TV		Potential
Covista Communications, Inc.		Potential
CTI Networks, Inc.		Potential
cyberMIND		Potential
DCT Telecom Group, Inc.		Potential
DirecTV	DirecTV	Potential
DSCI Corporation		Potential
DSL Extreme		Potential
DSLOPTIONS		Potential
DynaLink Communications, Inc.		Potential
Earthlink		Potential
Easton Telecom Services		Potential
EasyStreet Online Services		Potential
Ernest Communications, Inc.		Potential
FSN Broadband LP		Potential
Full Service Computing Corp	Full Service Computing Corp	Potential
ICON Technologies Inc.	ICON Technologies Inc.	Potential
Indigo Wireless		Potential
Interglobe Communications, Inc.		Potential
KINBER		Potential
LaunchNet		Potential
Layer Four Solutions, LLC		Potential
LocalNet Corp		Potential
Lumos Networks	Lumos Networks (formerly Ntelos Media)	Potential
Master Vision Cable		Potential

Filling Combany DBA	Filling Company Name	Status
Matrix Business Tech	Matrix Business Tech	Potential
Meriplex Communciations, Ltd	Meriplex Communciations, Ltd	Potential
Nitel, Inc.	Nitel, Inc.	Potential
Pennsylvania Cable Network		Potential
PulseNet	PulseNet	Potential
Purecom		Potential
Raystown Wireless	Raystown Wireless	Potential
SkyPacket Networks		Potential
StarTec Global Communications	StarTec Global Communications	Potential
SureWire Internet		Potential
Telefonica USA, Inc.	Telefonica Data Corp SA	Potential
Transbeam Inc.	Transbeam Inc.	Potential
U.S. Cellular	U.S. Cellular	Potential
United Online (NetZero/Juno)		Potential
Zayo Bandwidth Northeast, LLC	Zayo Bandwidth Northeast, LLC	Potential
Adams Cable Service	Adams Catv Inc	Provider
Airband Communications, Inc.	Airband Communications, Inc.	Provider
Armstrong Telephone - North (Duke Center)	Armstrong Tele Co	Provider
Armstrong Telephone- PA (Clinton Area)	Armstrong Tele Co	Provider
Armstrong Utilities	Armstrong Utilities	Provider
AT&T Corp, Inc.	AT&T Corp, Inc.	Provider
AT&T Mobility LLC	AT&T Mobility LLC	Provider
Atlantic Broadband	Atlantic Broadband (Penn), LLC	Provider
BackWoods Wireless	BackWoods Wireless	Provider
Beaver Valley Cable	Beaver Valley Cable Co Inc.	Provider
Bentleyville Communications Corporation	FairPoint Communications	Provider
Blue Devil Cable	Blue Devil Cable TV, Inc.	Provider
Blue Ridge Communications	Blue Ridge Communications	Provider
Broad Sky Networks	Broad Sky Networks	Provider
Brockway TV Inc	Brockway TV Inc	Provider
CABLEVISION	CSC HOLDINGS, INC	Provider
CATV Service	CATV Service, Inc.	Provider
CAWinet	CAWinet, Inc.	Provider
CenturyLink	CenturyTel, Inc.	Provider
ChiliTech Internet Solutions, Inc.	ChiliTech Internet Solutions, Inc.	Provider
Citizens Cable Communications	Citizens Cable Communications	Provider

Filling Combany DBA	Filling Company Name	Status
Citizens of Kecksburg	Citizens of Kecksburg	Provider
Clarity Connect, Inc.	Clarity Connect, Inc.	Provider
Clear.com	Clearwire Corporation	Provider
Coaxial Cable TV Corp	Coaxial Cable TV Corp	Provider
Cogent Communications, Inc.	Cogent Communications, Inc.	Provider
Comcast	Comcast Cable Communications, LLC.	Provider
Consolidated Communications	Consolidated Communications	Provider
Conterra Ultra Broadband, LLC	Conterra Ultra Broadband Holdings, Inc.	Provider
Cricket Communications, Inc.	Leap Wireless International, Inc.	Provider
DBSi	DBSi	Provider
DEPOSIT TELEPHONE COMPANY, INC.	TDS TELECOM	Provider
Double Dog	Double Dog	Provider
EagleZip.com	EagleZipCom LLC	Provider
Evenlink	Evenlink	Provider
First Telecom Services, LLC	First Telecom Services, LLC	Provider
Frontier Communications	Frontier Communications	Provider
Frontier Communications of Breezewood	Frontier Communications	Provider
Frontier Communications of Canton	Frontier Communications	Provider
Frontier Communications of Oswayo	Frontier Communications	Provider
Gap CableTV	Gap CableTV	Provider
Getwireless.net, Inc.	Getwireless.net, Inc.	Provider
Hancock Telephone Co	Hancock Telephone Co	Provider
Hickory Telephone Company	Hickory Telephone Company	Provider
Hometown Utili-com	Borough of Kutztown	Provider
HughesNet	Hughes Communications, Inc.	Provider
Hydrosoft Internet	Hydrosoft Internet	Provider
ICDC Wireless Inc.	ICDC Wireless Inc.	Provider
In the Stix Broadband, LLC	In the Stix Broadband, LLC	Provider
Innernet, Inc.	Innernet, Inc.	Provider
Interlync Internet Sevices, Inc.	Interlync Internet Sevices, Inc.	Provider
Ironton Telephone Co	Ironton Telephone Co	Provider
KCnet	Keystone Community Network, Inc.	Provider
Kuhn Communications	Kuhn Communications	Provider
Lackawaxen Telephone Co	Lackawaxen Telephone Co	Provider
Lantek	Lantek	Provider

Filling Combany DBA	Filling Company Name	Status
Laurel Highland Telephone Company	Laurel Highland Telephone Company	Provider
Level 3 Communications, LLC	Level 3 Communications, LLC	Provider
MAHANOY & MAHANTANGO TELEPHONE COMPANY	TDS TELECOM	Provider
Marianna and Scenery Hill Telephone Company	FairPoint Communications	Provider
Matrix Telecom, Inc. (TRINSIC, powered by Matrix)		Provider
MegaPath Corporation	MegaPath Corporation	Provider
Metrocast Cablevision	Metrocast Cablevision	Provider
MetroCast Communications	Gans Communications, LP	Provider
Navpoint Internet	Navpoint Internet	Provider
Netcarrier Telecom, Inc.	Netcarrier Telecom, Inc.	Provider
Netconex	Netconex	Provider
Nittany Media, Inc.	Nittany Media, Inc.	Provider
Noroc Broadband	Noroc Broadband LLC	Provider
North Penn	North Penn	Provider
One Communications	One Communications	Provider
PaCLEC Corporation	PaCLEC Corporation	Provider
Palmerton Telephone Co	Palmerton Telephone Co	Provider
Pennsylvania Telephone Co	Pennsylvania Telephone Co	Provider
Pitcairn Cable	Pitcairn Cable	Provider
Pymatuning Indep. Tel. Company	Pymatuning Indep. Tel. Company	Provider
QCOL, Inc	QCOL, Inc	Provider
RCN and RCN Business Services	RCN Telecom Services of Philadelphia, Inc.	Provider
RCN and RCN Business Services	RCN Telecom Services, Inc.	Provider
Service Electric Cable TV, Inc.	Service Electric Cable TV, Inc.	Provider
Service Electric Cablevision, Inc.	Service Electric Cablevision, Inc.	Provider
Shen-Heights TV Associates, Inc.	Shen-Heights TV Associates, Inc.	Provider
Sidera Networks	Sidera Networks, LLC	Provider
Skycasters	Skycasters, LLC	Provider
Smoothstone IP Communications	Smoothstone IP Communications	Provider
South Canaan Telephone Company	South Canaan Telephone Company	Provider
Sprint	Sprint Nextel Corporation	Provider
StarBand Communications Inc.	StarBand Communications Inc.	Provider
StarLinX Technical Services	StarLinX Technical Services	Provider

Filling Combany DBA	Filling Company Name	Status
Sti Wireless	Sti Wireless	Provider
Sting Communications	Sting Communications	Provider
SUGAR VALLEY TELEPHONE COMPANY	TDS TELECOM	Provider
Tele-Media	Tele-Media Company of Zion, LLC	Provider
Telnes Broadband	Telnes Broadband	Provider
The North-Eastern Pennsylvania Telephone Company	The North-Eastern Pennsylvania Telephone Company	Provider
Time Warner Cable	Time Warner Cable LLC	Provider
T-Mobile	T-Mobile USA, Inc.	Provider
Towerstream Corporation	Towerstream Corporation	Provider
USA Choice Internet	USA Choice Internet Services Company, LLC	Provider
Venus Telephone Corporation	Venus Telephone Corp.	Provider
Verizon Pennsylvania Inc.	Verizon Pennsylvania Inc.	Provider
Verizon Wireless	Cellco Partnership and its Affiliated Entities	Provider
Wave2Wave Communications	Wave2Wave Communications, Inc.	Provider
Wavecrazy	Wavecrazy	Provider
West Side Telecommunications	West Side Telephone Company	Provider
Western PA Internet Access		Provider
WestPAnet	WestPAnet	Provider
WildBlue Communications, Inc.	ViaSat	Provider
Windstream	Windstream Pennsylvania, Inc	Provider
Wire Tele-View Corp.	Wire Tele-View Corp.	Provider
World ConnX	World ConnX	Provider
XO Communications Services, Inc. (Affiliated Entity)	XO Communications, LLC	Provider
Yukon Waltz Telephone Company	Yukon Waltz Telephone Company	Provider
Zito Media	Zito Media, L.P.	Provider
Airespring, Inc.	Airespring, Inc.	Reseller
ALs Satellite	ALs Satellite	Reseller
Beacon Technologies	Beacon Technologies	Reseller
Computer Solutions, Inc.		Reseller
Cyberonic Internet Communications, Inc.		Reseller
Drizzle		Reseller
Hans Cedardale Satellite Inc.	Hans Cedardale Satellite Inc.	Reseller
IPNS		Reseller

Filling Combany DBA	Filling Company Name	Status
Juno Online Services, Inc.		Reseller
NetZero, Inc.		Reseller
New Edge Network, Inc.	Earthlink	Reseller
New Edge Network, Inc.	New Edge Holding Company	Reseller
Reliable ISP Solutions "RISP"		Reseller
Satellite Internet Broadband	Satellite Internet Broadband	Reseller
Telefonica USA		Reseller
TOAST.net	TOAST.net	Reseller
Tracon Telecom		Reseller
Virtuallycheap Internet Services		Reseller

DATA DEVELOPMENT & VALIDATION METHODOLOGIES WHITE PAPER

Commonwealth of Pennsylvania
State Broadband Initiative (SBI)
Broadband Mapping Project

NTIA Data Submittal
April 1, 2013

Baker

Table of Contents

Introduction

The following sections of this document provide an overview of the process used for the SBI Broadband Mapping data development for the Commonwealth of Pennsylvania. The following narrative is depicted in Appendix A, Commonwealth of Pennsylvania SBI Process Workflow, and Appendix B, State Broadband Data Validation Workflow, included at the end of this document.

Broadband Provider Outreach Results

As a result of the outreach to broadband providers and investigating whether an internet service provider (ISP) fits the definition of a broadband provider as per the NOFA, the following is a summary of our findings:

288 Total Investigated ISPs
114 Total Confirmed Broadband Service Providers (unique Provider/DBAs combinations)
94 Broadband Service Providers who Supplied Data (unique Provider/DBAs combinations)
26 Total Confirmed Broadband Service Resellers
4 Broadband Service Resellers who Supplied Data

Attachment C, Master Outreach List, contains additional provider information.

Broadband Provider Outreach Procedure

The following outreach procedure provides the framework for communicating with Broadband Service Providers (providers). The primary goals of the outreach approach documented herein are to:

Promote provider understanding and acceptance of the Broadband Mapping process, results, and benefits
Clarify NTIA Broadband Mapping requirements
Facilitate data confidentiality agreements as required
Minimize the submittal of invalid data
Enhance provider understanding of the semi-annual update process
Work with providers to evaluate submittal options to facilitate data submittals

Data Submission Guidelines

Guidelines for the providers' submission of Broadband Mapping Data are documented in the "Data Submission Guidelines". These Guidelines define technical requirements, submission specifications, and coordination and documentation activities.

Pennsylvania Broadband Providers Website

A URL was deployed (http://www.bakergis.com/PABroadbandProvider/) to communicate and distribute NTIA NOFA requirements to providers along with outreach and data submittal materials including:

NTIA NOFA and subsequent clarification
Outreach letters to providers
Draft Non-Disclosure/Data Sharing Agreement
Quick Start Guides

Data Submission Guidelines
Data Transmittal Letter
Broadband Data Submittal Templates
Census TIGER Data
Data Submittal Assistance Contact Information

Outreach Delivery Vehicles

A State Broadband Mapping Initiative Call for Data letter from the Commonwealth of Pennsylvania Department of Community and Economic Development (DCED) was emailed to all providers in the Commonwealth. This initial provider contact letter described the program and the role of Michael Baker Jr., Inc. (Baker) acting on behalf of the DCED for Broadband Data Collection and Mapping.

Baker distributed a follow-up letter to all providers describing the data submittal requirements and material and help available to aid with the data submittals.

Submittal assistance was provided to providers that needed help with data submittals.

Presentations were conducted with various broadband provider associations to present the data submittal requirements and answer questions.

Email communication and electronic transfer of data was encouraged to facilitate a faster delivery of data and information.

A URL was deployed and promoted to distribute outreach material and information concerning the Broadband Mapping Project.

A secure FTP URL was provided for submittal of broadband data by providers.

A secure Broadband Provider Data Update Webportal was deployed for providers to redline/update their service coverage, rather than supply their updated coverage for the semi-annual data updates.

Inclusion of Resellers

With the request for data current as of December 31, 2011, resellers are being included in all of the outreach, data collection, data aggregation, and verification tasks. The following outreach form has been developed to secure the proper information and to minimize the resource commitment required by the reseller.

BROADBAND SERVICE PROVIDER INFORMATION					
****Please fill out one form per DBA and / or Technology of Transmission****					
Provider Name:					
Doing Business As (DBA) Name (if applicable):					
FCC Registration Number (FRN) (if applicable):					
Website Address:					
Do you own transmission equipment, including middle mile, for your service area or for any part? *(Termed 'Broadband Primary Provider' in FAQ's)*	☐	Yes	☐	No	
If you answered Yes, please indicate this coverage area by county, municipality, or zip code and a map will be provided for you to further define your coverage area.					
If you answered No, please indicate the Carriers you contract with to provide your company's broadband coverage. *(Termed 'Broadband Reseller' in FAQ's)*					
Do you resell broadband services for the entire area of each carrier above?	☐	Yes	☐	No	
If No, then please indicate your reseller coverage area(s) by county, municipality, or zip codes and a map will be provided for you to further define your reseller coverage area:					
Technology of Transmission: *(one per form)*					
☐	Asymmetric xDSL (ADSL)	☐	Symmetric xDSL (SDSL)		
☐	Cable Modem - DOCSIS 3.0	☐	Other Copper Wireline		
☐	Cable Modem - Other	☐	Optical Carrier / Fiber to the End User		
☐	Terrestrial Fixed Wireless - Unlicensed	☐	Terrestrial Fixed Wireless - Licensed		
☐	Terrestrial Mobile Wireless	☐	Electric Power Line		
☐	Satellite	☐	Other		
Speed Tiers: *What is the **Maximum** Broadband advertised speed ?*					
Maximum Advertised Downstream Speed	☐	Greater than 768 kbps and less than 1.5 mbps			
	☐	Greater than 1.5 mbps and less than 3 mbps			
	☐	Greater than 3 mbps and less than 6 mbps			
	☐	Greater than 6 mbps and less than 10 mbps			
	☐	Greater than 10 mbps and less than 25 mbps			
	☐	Greater than 25 mbps and less than 50 mbps			
	☐	Greater than 50 mbps and less than 100 mbps			
	☐	Greater than 100 mbps and less than 1 gbps			
	☐	Greater than or equal to 1 gbps			
Maximum Advertised Upstream Speed	☐	Less than or equal to 200 kbps			
	☐	Greater than 200 kbps and less than 768 kbps			
	☐	Greater than 768 kbps and less than 1.5 mbps			
	☐	Greater than 1.5 mbps and less than 3 mbps			
	☐	Greater than 3 mbps and less than 6 mbps			
	☐	Greater than 6 mbps and less than 10 mbps			
	☐	Greater than 10 mbps and less than 25 mbps			
	☐	Greater than 25 mbps and less than 50 mbps			
	☐	Greater than 50 mbps and less than 100 mbps			
	☐	Greater than 100 mbps and less than 1 gbps			
	☐	Greater than or equal to 1 gbps			

Figure 1 Reseller Outreach/Interview Form

Secure Broadband Provider Data Update Webportal

A secure web-based application for broadband service providers has been deployed to simplify and automate the semi-annual process for collecting and verifying data. The webportal provides an easy-to-use map redlining tool for updating a provider broadband service area and attributes. It is expected that the simplification and automation of the data collection process will increase participation and improve the timeliness of provider response, data accuracy and consistency. Providers are being encouraged to utilize this tool but data is still being accepted through other means and formats.

Figure 2 Provider Data Update Webportal Entry Page

The View/Edit Coverage Map functions via secure login/password and secured map services limit broadband providers to see and edit only their own data. Picklists of valid database attributes eliminates entry errors and create consistency. It also contains a workflow from initial provider input, saving of a provider's work-in-progress, provider formally submitting edits, aggregation into the master geodatabase, soliciting provider approval of aggregated data, and final approval of the edit.

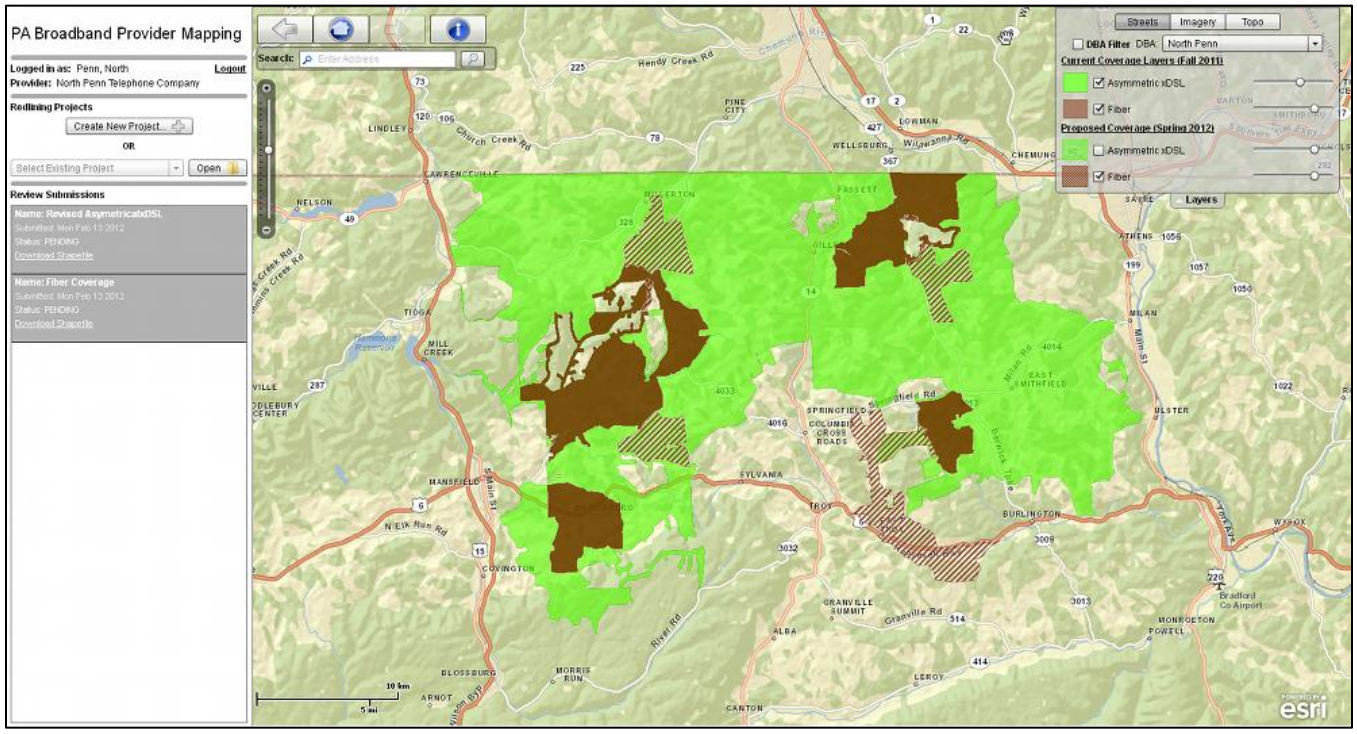


Figure 3 Provider Data Update Webportal –View/Edit Coverage Map Environment

Broadband Outreach Tracker Application

The Tracker application is utilized to collect all correspondence with providers and feedback on the effectiveness of the outreach activities by tracking items such as:

The number and content of incoming e-mails and letters submitted from the providers

The number and source of comments, questions, and suggestions made by providers

The number and source of comments, questions, and suggestions made by attendees at provider meetings and conference calls

Provider contact information and data submittal status.

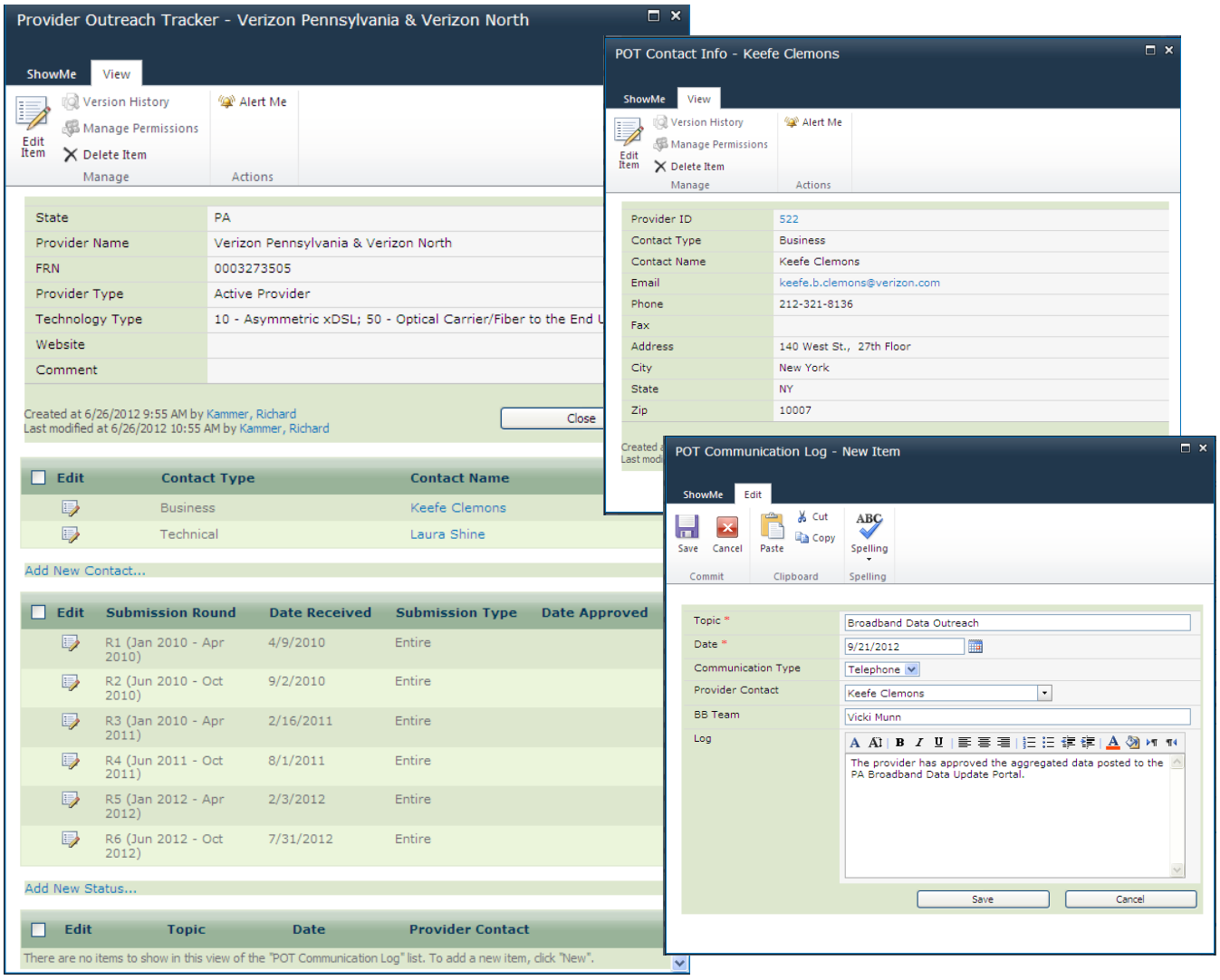


Figure 4 Broadband Outreach Tracker

Provider Submittal Validation

When a data submittal is received from a broadband service provider, it is updated in the Broadband Outreach Tracker and run through an initial validation process to assure that it meets the submittal guidelines.

Validation Checklist

The following items are part of this initial data validation process:

Verify provider's transmittal letter requested in Data Submission Guideline with is complete and matches submitted data

Verify the file naming conventions

Verify each file is machine readable

Verify data is in the correct GIS or Tabular format/file type

Verify each field is populated and no empty or NULL values are present for mandatory fields

Verify all ID (record number points) are unique within the submittal

Verify all attribute data is formatted according to the submittal guidelines
Verify topology for all geospatial submissions
Verify Metadata for all submissions
Verify the required contact information is included
Verify adherence to Data Submittal Guidelines (see http://www.bakergis.com/PABroadbandProvider/ to access Data Submittal Guidelines)
Broadband Service Availability (at least one)
Individual Street Addresses (Sec 3.1 & 4.1)
Census Blocks < 2 sq mi (Sec 3.3 & 4.3)
Street Segments for Census Blocks > 2 sq mi (Sec 3.2 & 4.2)
Service Overview (Sec 3.4 & 4.4)
Polygonal Boundary Area(s) (Sec 3.8 & 4.8)
Middle-mile Points (Sec 3.5 & 4.5)
Community Anchor Institutions (Sec 3.7 & 4.7)
Last Mile Connection Points (Sec 3.6 & 4.6)
WISP Antennas (Sec 4.9)

Data Usability Determination

The validation results are evaluated by the outreach and aggregation persons to determine the usability of the data. If the data meets the submission specifications, it is forwarded on for data aggregation. If it is determined to be unusable, it is returned to the provider for resolution. If the data can be manipulated to get it into a usable format, it is manipulated as required, and then forwarded on for data aggregation.

SBI Data Development

Data from the providers may be submitted in various formats as defined in the Data Submittal Guidelines, or in some cases unspecified formats may be accepted to help facilitate provider participation. Depending on the format of the submitted data, it is processed through one of the following processes to upgrade it to the NTIA SBI data standards.

Spatial Data

After validation and any required manipulation of any spatial data submitted by the providers, it is georeferenced and simply loaded into the appropriate NTIA geodatabase feature class.

Address Data Geocoding

If not already in the standard address point template, the provider tabular address data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. ArcGIS geocoding tools are then utilized geospatially locate the address points for the tabular records. Interactive address rematching is performed against two additional street centerline datasets as needed to increase geocoding matching results. The NTIA deliverable is the geocoded address point geodatabase table. The geocoded address points are also subsequently aggregated to the census block or road segment feature class for public web map display.

Census Block Aggregation

If not already in the standard census block template, the provider tabular census block data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. The provider tabular census block records are then joined to the geodatabase 2010 U.S. Census Block. This join is performed as many times as necessary for multiple Trans Tech values for each Provider/Census Block combination. The NTIA deliverable is the census block geodatabase table.

If the list of census blocks contains blocks > 2 sq. miles then these blocks are used to select all the 2010 U.S. Census TIGER centerlines that intersect those blocks. The Census Block record data is aggregated to each Road Segment within the Census Block. This process is performed as many times as necessary for multiple Trans Tech values for each Provider/Census Block combination.

Road Segment Aggregation

If not already in the standard road segment template, the provider road segment data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. If the provider submittal included graphic centerline segments, these are migrated into the delivery geodatabase along with the linked attribute records. If the provider submittal was tabular road segment records only, they are then joined to the geodatabase 2010 U.S. Census TIGER centerline feature class. This join is performed as many times as necessary for multiple Trans Tech values for each Provider/Road Segment combination. The NTIA deliverable is the road segment geodatabase table.

If the provider road segment data lie within census blocks <= 2 sq. miles then the road segment data is aggregated to the census block. This process is performed as many times as necessary for multiple Trans Tech values for each Provider/Road Segment combination. The NTIA deliverable is the road segment geodatabase table.

Overview Data Aggregation

Provider Service Availability Areas submitted for entire county areas are loaded into the NTIA geodatabase Overview table. If not already in the standard template, the provider data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. The provider overview records are then joined to the geodatabase 2010 U.S. Census County feature class. This join is performed as many times as necessary for multiple Trans Tech values for each Provider/County Area combination.

Polygonal Boundary Aggregation/Integration

Providers submitting polygonal service area data are handled in two ways. Wireline Provider data is aggregated to the census block feature class for areas where census blocks <= 2 sq. mi., or road segment feature class for areas where census blocks > 2 sq. mi. Wireless Provider Service Availability Areas submitted by polygonal area are simply loaded into the NTIA geodatabase Poly_Bndry feature class.

Wireline Provider

The polygonal data is georeferenced and loaded into the Poly_Bndry feature class. The polygon is then attributed, manually if necessary. Depending on the area, census blocks < or => 2 sq. mi., a selection set of either

census blocks or road segments that intersect the polygon boundary is created. The attributed polygon boundary is then joined with census blocks or road segments table to attribute accordingly. This join is performed as many times as necessary for multiple Trans Tech values for each Provider/County Area combination. The NTIA deliverable is the census block or road segment geodatabase table.

Wireless Provider

The polygonal data is georeferenced and loaded into the Poly_Bndry feature class. The polygon is then attributed, manually if necessary. Multiple Poly_Bndry records are created for multiple Trans Tech values for each provider. The NTIA deliverable is the polygon boundary geodatabase table.

Middle/Last Mile Data Integration

If not already in the standard template, the data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. The point features are geo-located utilizing the lat/long information provided. The NTIA deliverable is the middle or last mile geodatabase table.

Community Anchor Institution Integration

Providers supplied some Community Anchor Institution (CAI) data with the data submittals. But the majority of the data was collected from existing GIS Layers maintained by the Commonwealth of Pennsylvania, outreaching to CAIs through state agencies and their contacts, and having CAIs complete an online survey at http://www.bakerbb.com/pa_institution_survey/.

Provider CAIs

If not already in the standard template, the data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. The point features are geo-located utilizing the lat/long information provided. Address data is used to geocode locations only when lat/long data is not provided.

Commonwealth CAIs

CAI shapefiles were provided through the Commonwealth's other geospatial efforts. The shapefiles were then exported to the NTIA geodatabase CAI feature class. Various sources for obtaining broadband information for the CAIs were utilized. Various state agencies provided some of the information, i.e. Pennsylvania Department of Education (PDE) provided tabular broadband information for schools, PDE provided tabular broadband information for libraries, and Pennsylvania State Police provided tabular broadband information for their facilities. A CAI data survey website was also deployed and the URL distributed by various state agencies to the CAI contacts. Data from all of these sources were then aggregated into the CAI geodatabase table for the NTIA deliverable.

USAC –CAI Web Scraping

To enhance the CAI inventory, a web scraping tool has been developed to automatically query the USAC public website, http://www.slforms.universalservice.org/DRT/Default.aspx, in a batch mode and extract school and library CAI data for Pennsylvania. This extracted information supplements the CAI data collected by the other methods.

Typical Speeds from Other Sources

Because not all providers are submitting the typical speed attribution with their data, a method to fill in the missing information has been developed using other sources. The method utilizes speed test data supplied through the FCC speed test information as well as from other speed test data that we are independently collecting. Business rules have been established so quality and realistic typical speeds are produced. The end result is a more complete data submittal to NTIA.

Propagation Modeling

Fixed wireless broadband transmission is a diverse technology. Service may be transmitted over licensed and unlicensed spectrum, and delivered by larger corporate or smaller LLC business entities, many of which serve rural areas of the State. This diversity has resulted in varying levels of SBI participation including Providers that have:

participated,

refused to participate,

wished to participate but lack adequate capabilities and/or tools, or

supplied data of marginal accuracy

The NTIA's supplemental grant funding has provided the means to generate propagation models to supplement and validate the above scenarios. In addition, the NTIA has identified fixed wireless service coverages with unusual shapes for state grantee analysis.

To facilitate development of propagation mapping, additional tower/antenna information is being requested from fixed wireless broadband providers. For those providers not responding to requests for required tower/antenna information, an attempt is made to gather the information through 3rd party sources and field investigation. The Provider, 3rd party and/or field data is processed using Terrain Analysis Package (TAP) software to develop propagation models. Maps of the resultant propagation study are sent to the fixed wireless providers for their feedback on the propagation model produced for their company.

Data Verification Summary

Pennsylvania's broadband mapping project employs a multi-prong approach to ensure the provider data is accurate and complete.

In summary, the project employs the following validation methodologies and resources:

Provider Validation
Data Validation via Market Intelligence Sources
Data Validation Using State Supplied Data Points
Field Validation
Wireless Coverage Analysis
Topology Validation
Automated Validation Processing
Confidence Level/Statistical Modeling

SBDD Check Submission
Stakeholder Validation

The remainder of this verification section describes the various methods in greater detail.

Provider Validation

After data development, service availability maps are generated and submitted to the providers to validate their mapping results. This provides a "sign off" on the interpretation of the submitted data and extends the outreach efforts by providing a visual representation of the data to be delivered to the State and the NTIA.

Types of Provider Maps

Provider maps generally consist of the following types.

Outreach Maps

Often, providers will send data which does not contain all the information needed for a NTIA compliant dataset. In such cases, as an aid to the outreach communication, it may be necessary to produce a map to help the provider locate their service area or verify data they have provided. These maps may take many forms, but generally are of two types:

General Location Maps – these maps are often produced when the provider does not have a list of address or other standard submittal data and needs help defining their service area. A typical map will show counties, major roads, and towns of the general area the provider has stated as their service area. The intent of the map is to give the provider a way to markup or delineate their service area. If a provider has not provided required attribute information such as Technology of Transmission, Speed Data, etc. then it may be necessary to add a visual clue to this data like an information stamp on the map that they can easily fill out. If the provider sends the map back with a service area boundary, this can then be digitized and sent back to the provider for verification.

Verification of Provider Supplied Boundaries – these maps are produced when the provider has sent service area boundary information which is confusing or otherwise unclear. Often these are produced when providers send CAD maps, hand drawn maps that need digitization, or lists of zip codes or counties served. A typical map will place the interpreted boundary over a location map so the provider can verify the service area. As with the General Location Map, information stamps or other visual clues may be placed on the map.

Initial Verification Maps

Once the provider data has been processed and the census block and road segment feature classes created, an Initial Verification Map (Figure 5) is produced to give the provider a visual representation of their service area by census block. These maps enable the provider to verify their service area and make changes if necessary. Initial Verification Maps are produced using a set of standards and produced at the highest resolution necessary to convey the map information to the provider. Initial Verification Maps are also produced for Wireless Polygon areas.

Detailed Verification Maps

Providers who have questions about their service areas may request additional information to help clarify issues. In these cases, it may be necessary to create a Detailed Verification Map to highlight the areas in question. Detailed Verification Maps provide the same information as Initial Verification Maps only at a higher resolution. Several maps may be needed to accurately portray an area in question.

Revised Maps

Revised maps take two forms:

Initial or Detailed Verification Maps which have been annotated or marked-up by the provider
Outreach produced Initial or Detailed Verification Maps incorporating provider changes

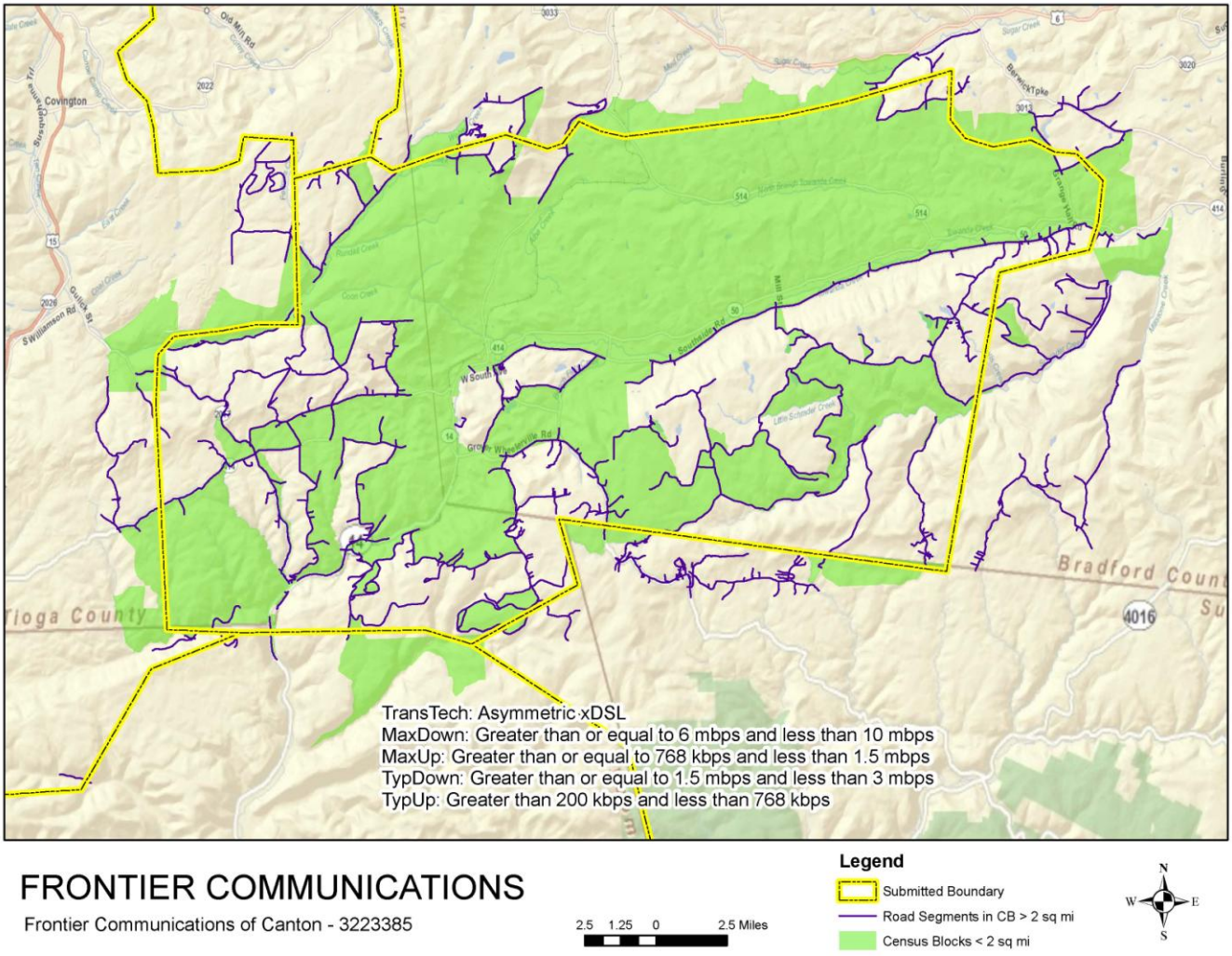


Figure 5 Provider Map

Data Validation

A critical component of the project is the validation of the data submitted by the broadband service providers. Data from various sources, as described in more detail in the following sections, is utilized to develop a level of confidence in the data received from the broadband providers.

Validation Data Set Collection and Development

This validation process employs data sets developed or acquired from different sources as described in the following sections.

Provider Feedback Loop: Maps of completed provider service areas and data are furnished back to the providers for confirmation of the processed/aggregated information. Feedback is integrated into the each provider's dataset.

Telogical Systems Wireline Market Intelligence Data: This commercially available dataset was developed using a methodology that incorporates deep web crawling and additional means, including direct mail harvesting and advertising collaterals (including door to door) to gather cable and telecommunication provider information. This dataset is used as a validation source for wireline provider service area coverage, Technology of Transmission, and Speed.

American Roamer Wireless Market Intelligence Data: This commercially available dataset is used as an independent source to verify information submitted by providers of wireless broadband service. This dataset is used as a validation source for wireless provider service area coverage.

Prior Commonwealth Broadband Mapping Dataset: Under the requirements of the Commonwealth's Act 183 of 2004 legislation, broadband coverage data was previously collected by the Commonwealth. These datasets are used as a validation source for provider service area coverage and Technology of Transmission.

FCC Speed Test: The FCC speed test data includes the IP addresses for each specific speed test conducted. This IP address is queried against a web search engine to determine the provider assigned to that address and is used as a validation source for the provider service coverage and typical speeds.

Fixed Wireless Line of Sight Analysis: Utilizing the existing PAMAP LiDAR for topography generation and determining tower/antennae heights, line of sight analysis is performed to determine areas of reported fixed wireless broadband coverage that is questionable.

Field Data Acquisition: Broadband technicians visited a sampling of census block locations to gather broadband data to be used for validation. The following criteria were taken into account when developing the census block sampling dataset:

urban vs. rural census block characteristic
censes block grouping
land vs. water census block characteristic

The overarching mission of the Federal broadband stimulus program is to expand Broadband service to areas that are currently unserved and underserved. Also, the market intelligence validation sources typically represent

some rural, but more urban areas. Thus, our field data collection efforts were targeted more towards the rural areas; split 90% rural, 10% urban.

Additionally, a study by Penn State University (Glasmeier 2002) notes that a large number of census block groups typically fit within any given cable or telephone company service areas. Therefore, our field sample was also based on selection of one census block per block group and a land mass greater than 50% to avoid field visiting areas covered mostly by water. There are a total of 10,387 block groups in PA. Using a statistical sample size calculator based upon the number of block groups in the state and +/- 4% margin of error at a 95% confidence level, the sample size is 568 census block locations statewide. The procedure for selecting the calculated field verification census blocks is provided below.

Select one census block per census block group
Convert the census block groups polygon to label points.
Select the census block polygon by doing a spatial selection using census block groups label points.
Select from the current selection where the census block land mass is 50% or greater and the block is rural.
Export the selected blocks to a new shapefile. This reset the FID for the next step.
Select every 2nd, 3rd, 4th, or so on to get the desired number of blocks. Query used to select: MOD("FID",2) = 0. This will select every other record.

The planned census block field locations are shown in Figure 6.

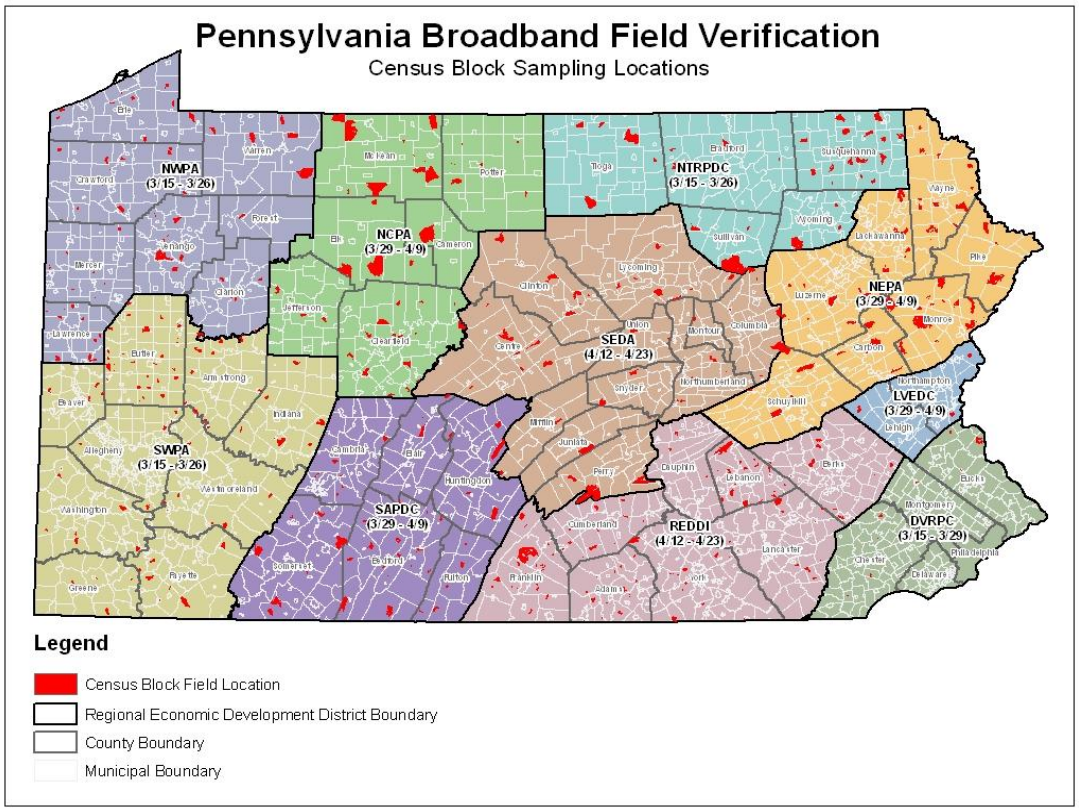


Figure 6 Planned Field Verification Census Block Locations

For each census block in the sample set, broadband technicians collected data using Panasonic Toughbook computers, loaded with MapPoint mapping software, and a customized Microsoft Access data collection form with the ability to automatically import GPS coordinates. The sample census blocks were pre-loaded and directly accessible from MapPoint. Two types of data collection were conducted (infrastructure observation and wireless speed testing) and the results were recorded and linked to the corresponding field location coordinates within the designated sample census block. The information collected by the field broadband technicians includes:

Wireline:

GPS coordinates
circuit infrastructure feeding the area (copper, fiber, cable)
local distribution hut equipment inspection, where allowed/possible
witness access circuit speed tests, where allowed/possible
facility elevation (measurement relative to grade), where allowed/possible
distance from DSLAM measurement where applicable and determine access speed capability with an accuracy within 500ft using mapping software
collect site pictures

Wireless:

GPS coordinates
internet speed test

The map in Figure 7 shows the locations (blue points) of the census block field surveys that were performed.

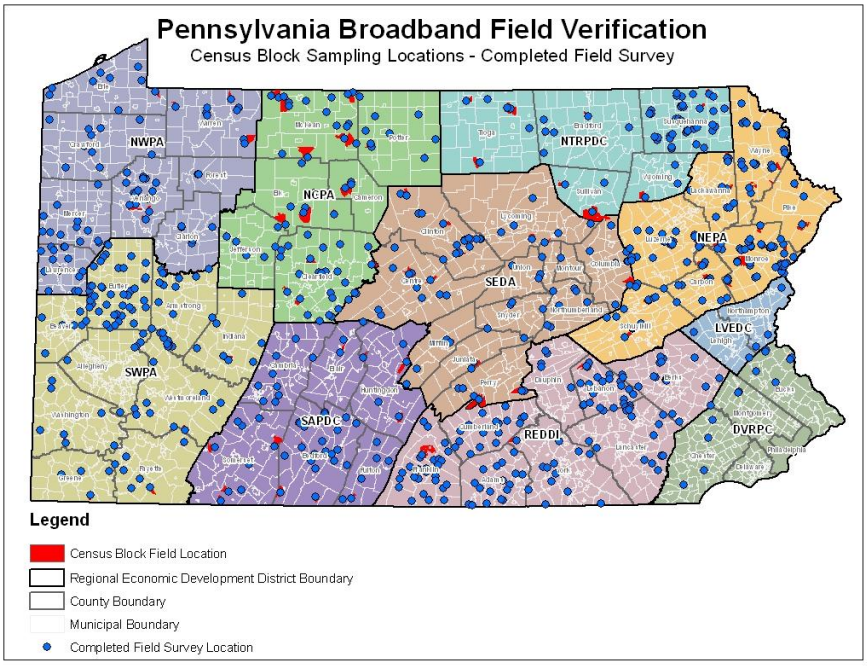


Figure 7 Completed Field Verification Locations

For the 568 census blocks that were visited, 2821 individual wired/wireless data elements were recorded and 3666 pictures were taken at those locations. This field collected dataset is used as a validation source primarily for wireline and wireless technology of transmission, middle mile, and wireless speed.

Provider Data Validation Process

Provider Feedback Loop: Feedback received from the providers is visually inspected and integrated directly in the mapping GIS database.

Service Area Validation Data: The Telogical wireline service area data is tabular and contains a separate record for each provider/technology of transmission combination with an associated census block or TIGER road segment, depending on the whether the size of the census block area (=/< or > 2 sq. mi.). This data is exported into an ArcGIS data format. The American Roamer wireless service area data is already in and ArcGIS data format. The validation data is then joined to the provider service area data by census block or TIGER road segment ID. Any database records in the provider or validation tables that cannot be joined are output to a separate layer that indicates the areas of discrepancy between the two datasets. The joined tables are then queried to detect any speed discrepancies which are also output to a separate discrepancy layer.

Topology: The ArcGIS Validate Topology Tool is used to flag any topology issues in the broadband data. Flagged issues are reviewed to identify false positives and update true errors as required.

SBI Check Submission: The NTIA-provided SBI Check Submission tool is utilized to validate that the deliverable broadband data is consistent with the business logic rules set forth by the NTIA and a passing receipt is provided with the data submittal to NTIA.

Stakeholder Feedback: The state broadband mapping website includes a feedback function. Comments received from stakeholders such as the regional Economic Development Districts and the public are reviewed and used to validate the provider data submissions.

Validation and Confidence Level Reporting

To facilitate validation and confidence level reporting, Baker deployed a validation application called Statistical Evaluation and Assessment System (SEAS) which automatically compares the multiple independent validation datasets against the broadband service providers' supplied information. The SEAS application uses statistical methodologies to report the confidence level in the spatial and attribute accuracy of the information. Appendix B shows the validation workflow.

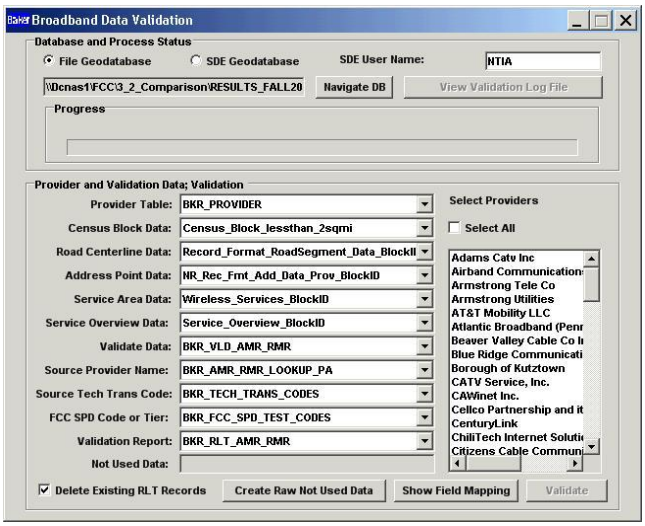


Figure 8 SEAS

The SEAS comparison is a three-part validation process:

Comparison of the collected validation source against

the aggregated broadband provider data.
Match percentage calculation for each provider reported in the DataPackage.xls, "Provider Table" tab, "Comments" column.
Confidence score calculation displayed on the state broadband website.

After completing all validation data source collections, SEAS is used to automatically compare the multiple validation datasets against the aggregated broadband data which came from the providers. Through the SEAS accumulation table, it produces a match percentage per broadband service record based upon the number of matches that record has against each validation source. The matched percentage for each record is the result of the total count of the matched validations for the record divided by the total validation source being compared against the record. Validation confidence rating/score is assigned on a scale of 1 to 5 based upon the percentage of validation source matches as per the following score results:

1 Star = 0% - 19% Match
2 Stars = 20% - 39% Match
3 Stars = 40% - 59% Match
4 Stars = 60% = 79% Match
5 Stars = 80% - 100% Match
"No Analytics" = No validation source available for that provider

The Commonwealth's public broadband mapping website (www.broadbandinpa.com) is updated with the confidence level results at the record level based upon the queried geographic location and the following shows an example of this representation.

Provider Name	Transmission Technology	Max Download Speed	Max Upload Speed	Confidence Score
AT&T Mobility	Mobile Wireless	Greater than or e…	Greater than or e…	★★★☆☆
Verizon	Asymmetric xDSL	Greater than or e…	Greater than or e…	NO ANALYTICS
Comcast	Cable Modem – Other	Greater than or e…	Greater than or e…	★★★★☆

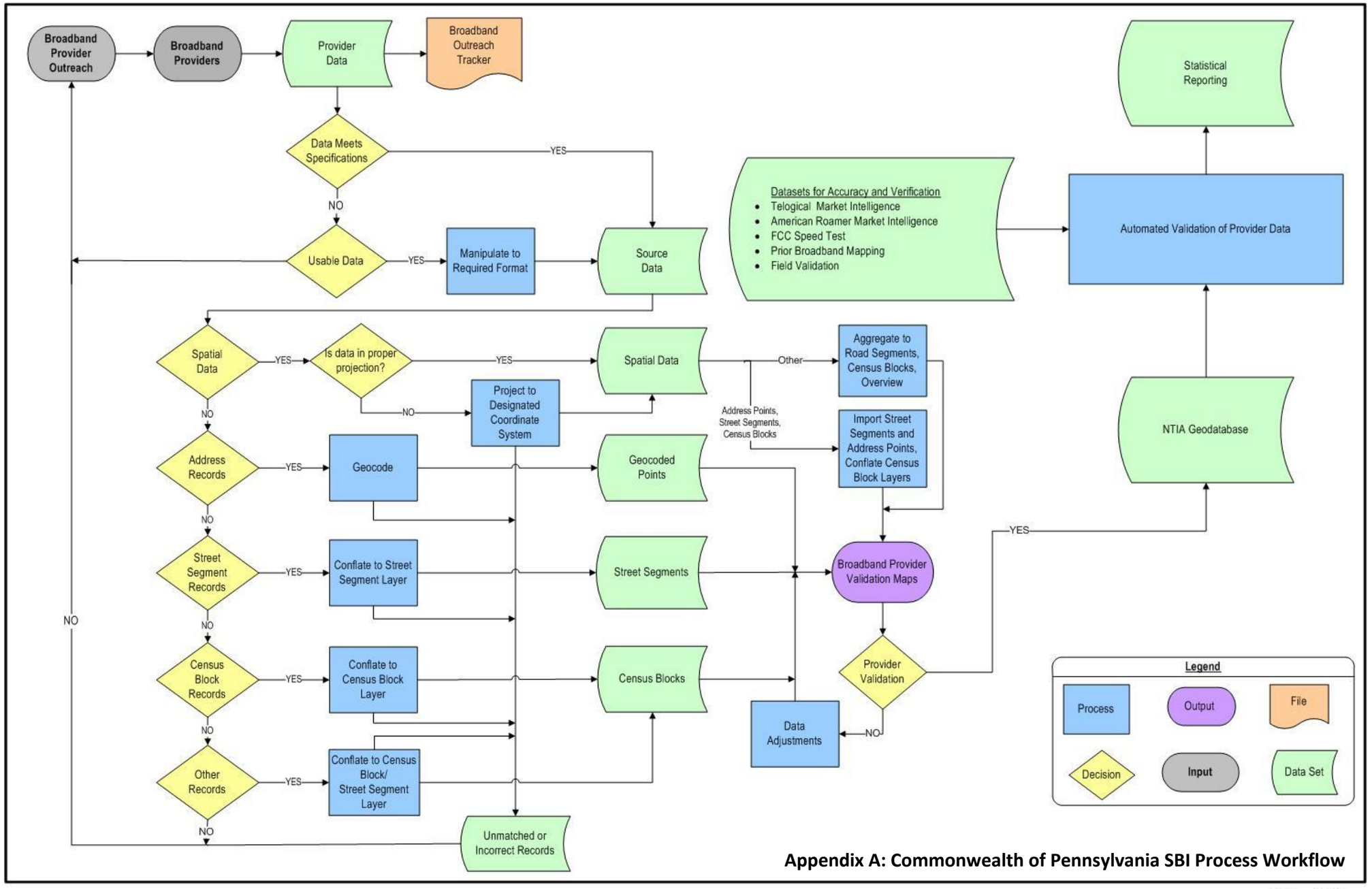
The matched percentage for the records for each provider are summarized and then divided by the total count of the records to create the final matched percentage for the specific provider. These percentages are included in DataPackage.xls on the Provider Table tab in the Comments column.

Low Confidence Provider Feedback

Provider data which is assigned a low confidence (1 or 2 stars) through the SEAS process is communicated back to the provider through a feedback loop. Generally, the low confidence feedback and reconciliation is a continuous refinement process and usually occurs between update cycles. The goal is to provide this feedback through the Provider Data Update Webportal via a web connection that is available and rolled out to providers in January 2012.

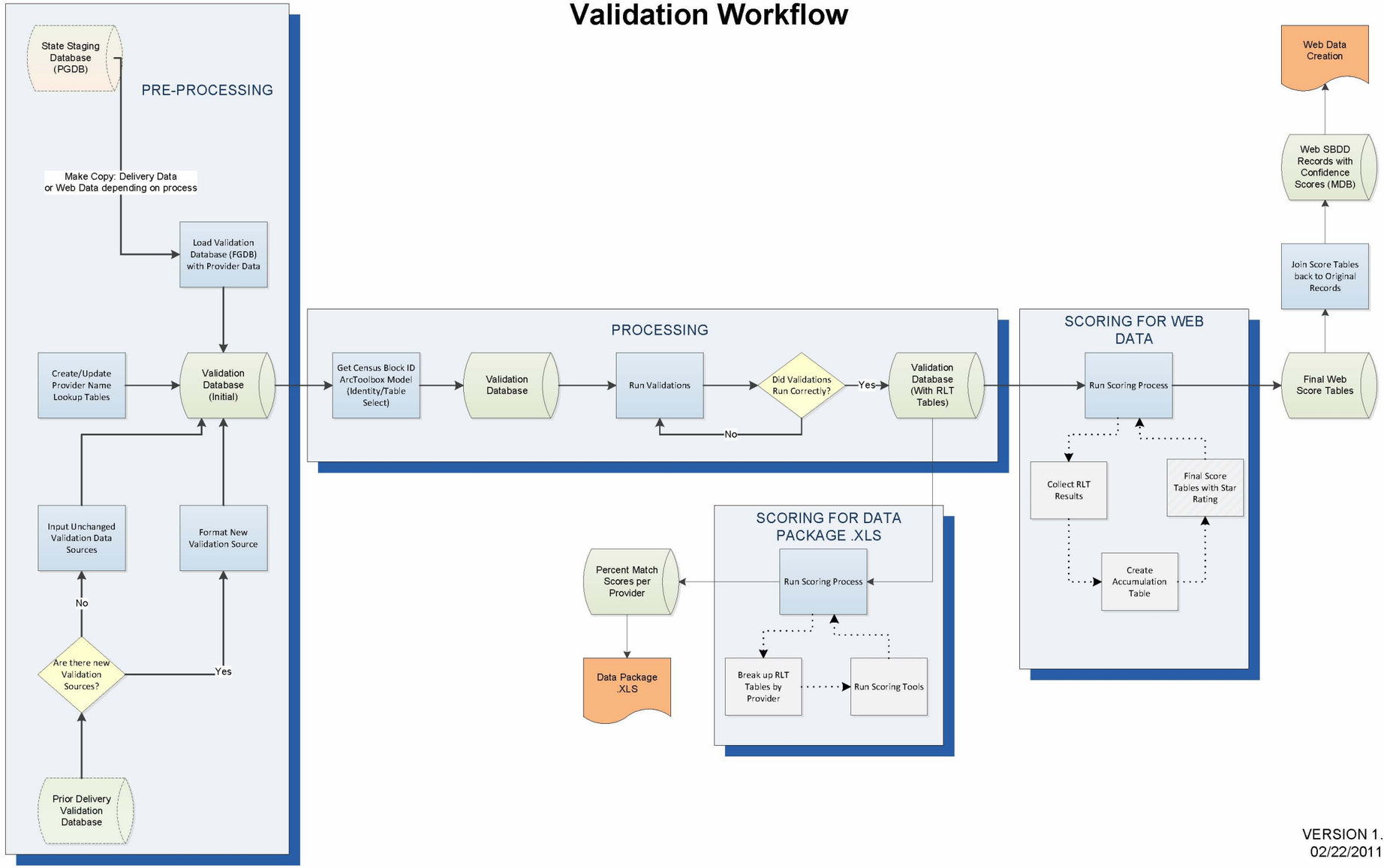
Changes and Corrections Documentation

With each semi-annual NTIA data submittal, changes and corrections documentation is provided. Significant changes in a provider's status or data, corrections to previously supplied data, providers supplying data for the first time, etc. are specified by Provider name in the Changes and Corrections document.



Appendix A: Commonwealth of Pennsylvania SBI Process Workflow

Appendix B: State Broadband Data Validation Workflow



VERSION 1.1
02/22/2011

Appendix C: Master Outreach List

Filling Combany DBA	Filling Company Name	Status
1USA.COM	1USA.COM	Not a Broadband Provider or Reseller
21st Century Resoration & SLS		Not a Broadband Provider or Reseller
2s Graphic Design Inc.		Not a Broadband Provider or Reseller
A P Wireless		Not a Broadband Provider or Reseller
AboveNet	AboveNet	Not a Broadband Provider or Reseller
Access Northeast	Access Northeast	Not a Broadband Provider or Reseller
Advanced Mobile Group		Not a Broadband Provider or Reseller
AllCoNet		Not a Broadband Provider or Reseller
Alteva Communications	Alteva Communications	Not a Broadband Provider or Reseller
Altius Broadband	Altius Broadband	Not a Broadband Provider or Reseller
American Digital Online Services, Inc. (ADOS)		Not a Broadband Provider or Reseller
American Telephone Company LLC	American Telephone Company LLC	Not a Broadband Provider or Reseller
Antietam Cable	Antietam Cable	Not a Broadband Provider or Reseller
Bandwidth.com		Not a Broadband Provider or Reseller
Broadband.com		Not a Broadband Provider or Reseller
Budget Prepay, Inc. D/B/A Budget Phone, Inc.		Not a Broadband Provider or Reseller
BullsEye Telecom, Inc.	BullsEye Telecom, Inc.	Not a Broadband Provider or Reseller
BurstNET		Not a Broadband Provider or Reseller
Buytelco, Inc.		Not a Broadband Provider or Reseller
Cablesat		Not a Broadband Provider or Reseller
Cavalier Telephone LLC	Cavalier Telephone LLC	Not a Broadband Provider or Reseller
Cellular One of NEPA (Northeast Pennsylvania)		Not a Broadband Provider or Reseller
Charter Internet		Not a Broadband Provider or Reseller
CIMCO Communications, Inc.	CIMCO Communications, Inc.	Not a Broadband Provider or Reseller
Cincinnati Bell Inc.		Not a Broadband Provider or Reseller
Citynet Holdings, LLC	Citynet Holdings, LLC	Not a Broadband Provider or Reseller
Clearview Partners	Clearview Partners	Not a Broadband Provider or Reseller
Community TV Systems Inc	Community TV Systems Inc	Not a Broadband Provider or Reseller
Computer Central	Computer Central	Not a Broadband Provider or Reseller
CONXX	CONXX	Not a Broadband Provider or Reseller
Cpudirect Networks, LLC	Cpudirect Networks, LLC	Not a Broadband Provider or Reseller
Delmarva T1		Not a Broadband Provider or Reseller
Detwiler Communications Inc	Detwiler Communications Inc	Not a Broadband Provider or Reseller
Digital Connections, Inc.		Not a Broadband Provider or Reseller
DISH	DISH	Not a Broadband Provider or Reseller

Filling Combany DBA	Filling Company Name	Status
DSLBroker.com		Not a Broadband Provider or Reseller
Dubois Communications Inc	Dubois Communications Inc	Not a Broadband Provider or Reseller
Ducom, Inc.	Ducom, Inc.	Not a Broadband Provider or Reseller
EA Media	EA Media	Not a Broadband Provider or Reseller
East Palestine Internet	East Palestine Internet	Not a Broadband Provider or Reseller
Eduro Networks, LLC	Eduro Networks, LLC	Not a Broadband Provider or Reseller
Entelegent Solutions, Inc.		Not a Broadband Provider or Reseller
Global Crossing North America, Inc	Global Crossing North America, Inc	Not a Broadband Provider or Reseller
Graybar Utility		Not a Broadband Provider or Reseller
Ground Control		Not a Broadband Provider or Reseller
Herr Cable	Herr Cable	Not a Broadband Provider or Reseller
Hotwire Communications, Ltd.	Hotwire Communications, Ltd.	Not a Broadband Provider or Reseller
Immix Wireless	Keystone Wireless, LLC	Not a Broadband Provider or Reseller
International Broadband Electric Communications, Inc. (IBEC, Inc)		Not a Broadband Provider or Reseller
Internet Communications Inc.		Not a Broadband Provider or Reseller
ISP 1		Not a Broadband Provider or Reseller
JB Cable	JB Cable	Not a Broadband Provider or Reseller
Leap Wireless International, Inc.	Leap Wireless International, Inc.	Not a Broadband Provider or Reseller
LightEdge Solutions, Inc.	LightEdge Solutions, Inc.	Not a Broadband Provider or Reseller
Line Systems, Inc.	Line Systems, Inc.	Not a Broadband Provider or Reseller
MediaFLO	Qualcomm	Not a Broadband Provider or Reseller
Metropolitan Telecommunications	Metropolitan Telecommunications	Not a Broadband Provider or Reseller
Milestone Communications Inc.	Milestone Communications Inc.	Not a Broadband Provider or Reseller
Millheim TV Transmission Company	Millheim TV Transmission Company	Not a Broadband Provider or Reseller
MTT First	MTT First	Not a Broadband Provider or Reseller
Near You Networks	Near You Networks	Not a Broadband Provider or Reseller
NEPAwireless	NEPAdate.com Ventures, LLC	Not a Broadband Provider or Reseller
One-Stop Communications of PA Inc.		Not a Broadband Provider or Reseller
OpenRange Communiciations	OpenRange Communiciations	Not a Broadband Provider or Reseller
Optical Telecommunications Inc.		Not a Broadband Provider or Reseller
PAETEC Communications, Inc.	PAETEC Communications, Inc.	Not a Broadband Provider or Reseller
PAOnline	PAOnline	Not a Broadband Provider or Reseller
PenTeleData Limited Partnership I	PenTeleData Limited Partnership I	Not a Broadband Provider or Reseller
Phoenix Cable Incorporated	Phoenix Cable Incorporated	Not a Broadband Provider or Reseller
PNG Telecommunications		Not a Broadband Provider or Reseller
Presque Isle Technology Solutions		Not a Broadband Provider or Reseller

Filling Combany DBA	Filling Company Name	Status
Qwest Communications Company, LLC	Qwest Communications International	Not a Broadband Provider or Reseller
RealLinx	RealLinx	Not a Broadband Provider or Reseller
Reliance Globalcom Services, Inc.	Reliance Globalcom Services, Inc.	Not a Broadband Provider or Reseller
Retel TV Cable	Retel TV Cable	Not a Broadband Provider or Reseller
SCR Online		Not a Broadband Provider or Reseller
Self Service America, discount ISP		Not a Broadband Provider or Reseller
SkywayUSA	Skyway	Not a Broadband Provider or Reseller
Snip Link LLC	Snip Link LLC	Not a Broadband Provider or Reseller
Somerfield Cable TV		Not a Broadband Provider or Reseller
Southside TV	Southside TV	Not a Broadband Provider or Reseller
Stage 2 Networks, LLC		Not a Broadband Provider or Reseller
Steel City Broadband		Not a Broadband Provider or Reseller
Sunset Net		Not a Broadband Provider or Reseller
Telovations, Inc.		Not a Broadband Provider or Reseller
tw telecom inc.	tw telecom inc.	Not a Broadband Provider or Reseller
TWR Communications		Not a Broadband Provider or Reseller
UHP Wireless Networks		Not a Broadband Provider or Reseller
USA Digital Communications		Not a Broadband Provider or Reseller
Valley Cable Systems	Valley Cable Systems	Not a Broadband Provider or Reseller
Ward Communications	Ward Communications	Not a Broadband Provider or Reseller
Westfield Community Antenna Assoc.	Westfield Community Antenna Assoc.	Not a Broadband Provider or Reseller
Whitefence		Not a Broadband Provider or Reseller
Wireless PA Internet Access	Wireless PA Internet Access	Not a Broadband Provider or Reseller
Xand		Not a Broadband Provider or Reseller
Zampelli Electronics	Zampelli Electronics	Not a Broadband Provider or Reseller
ACC Business	Affiliate of AT&T	Other
Fisk Internet Services, LLC	Affiliate of Getwireless.net, Inc.	Other
Jefferson County Cable	Affiliate of Blue Devil CAble TV, Inc.	Other
Pencor Services, Inc.	Affiliate of Blue Ridge Communications	Other
Prescient Worldwide		Other
Shentel	Affiliate of Sprint	Other
Susquehanna Communications	Affiliate of Comcast Cable Communications, LLC	Other
American Telecharge, Inc.		Potential
BCN Telecom, Inc.		Potential

Filling Combany DBA	Filling Company Name	Status
BetterWorld Telecom, LLC		Potential
Broadband Dynamics, LLC D/B/A Diversified		Potential
Broadband National		Potential
Broadstar, LLC		Potential
Broadview Networks Holdings, Inc.	Broadview Networks Holdings, Inc.	Potential
Broadvox		Potential
Business Automation Technologies, Inc. d/b/a Data Network Solutions		Potential
C Spire Wireless		Potential
Cambria Connected		Potential
Cooperative Communications, Inc.		Potential
Country Cable TV		Potential
Covista Communications, Inc.		Potential
CTI Networks, Inc.		Potential
cyberMIND		Potential
DCT Telecom Group, Inc.		Potential
DirecTV	DirecTV	Potential
DSCI Corporation		Potential
DSL Extreme		Potential
DSLOPTIONS		Potential
DynaLink Communications, Inc.		Potential
Earthlink		Potential
Easton Telecom Services		Potential
EasyStreet Online Services		Potential
Ernest Communications, Inc.		Potential
FSN Broadband LP		Potential
Full Service Computing Corp	Full Service Computing Corp	Potential
ICON Technologies Inc.	ICON Technologies Inc.	Potential
Indigo Wireless		Potential
Interglobe Communications, Inc.		Potential
KINBER		Potential
LaunchNet		Potential
Layer Four Solutions, LLC		Potential
LocalNet Corp		Potential
Lumos Networks	Lumos Networks (formerly Ntelos Media)	Potential
Master Vision Cable		Potential

Filling Combany DBA	Filling Company Name	Status
Matrix Business Tech	Matrix Business Tech	Potential
Meriplex Communciations, Ltd	Meriplex Communciations, Ltd	Potential
Nitel, Inc.	Nitel, Inc.	Potential
Pennsylvania Cable Network		Potential
PulseNet	PulseNet	Potential
Purecom		Potential
Raystown Wireless	Raystown Wireless	Potential
SkyPacket Networks		Potential
StarTec Global Communications	StarTec Global Communications	Potential
SureWire Internet		Potential
Telefonica USA, Inc.	Telefonica Data Corp SA	Potential
Transbeam Inc.	Transbeam Inc.	Potential
U.S. Cellular	U.S. Cellular	Potential
United Online (NetZero/Juno)		Potential
Zayo Bandwidth Northeast, LLC	Zayo Bandwidth Northeast, LLC	Potential
Adams Cable Service	Adams Catv Inc	Provider
Airband Communications, Inc.	Airband Communications, Inc.	Provider
Armstrong Telephone - North (Duke Center)	Armstrong Tele Co	Provider
Armstrong Telephone- PA (Clinton Area)	Armstrong Tele Co	Provider
Armstrong Utilities	Armstrong Utilities	Provider
AT&T Corp, Inc.	AT&T Corp, Inc.	Provider
AT&T Mobility LLC	AT&T Mobility LLC	Provider
Atlantic Broadband	Atlantic Broadband (Penn), LLC	Provider
BackWoods Wireless	BackWoods Wireless	Provider
Beaver Valley Cable	Beaver Valley Cable Co Inc.	Provider
Bentleyville Communications Corporation	FairPoint Communications	Provider
Blue Devil Cable	Blue Devil Cable TV, Inc.	Provider
Blue Ridge Communications	Blue Ridge Communications	Provider
Broad Sky Networks	Broad Sky Networks	Provider
Brockway TV Inc	Brockway TV Inc	Provider
CABLEVISION	CSC HOLDINGS, INC	Provider
CATV Service	CATV Service, Inc.	Provider
CAWinet	CAWinet, Inc.	Provider
CenturyLink	CenturyTel, Inc.	Provider
ChiliTech Internet Solutions, Inc.	ChiliTech Internet Solutions, Inc.	Provider
Citizens Cable Communications	Citizens Cable Communications	Provider

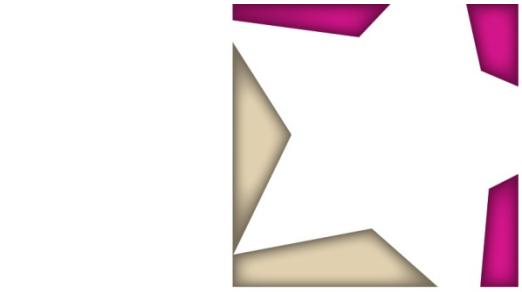
Filling Combany DBA	Filling Company Name	Status
Citizens of Kecksburg	Citizens of Kecksburg	Provider
Clarity Connect, Inc.	Clarity Connect, Inc.	Provider
Clear.com	Clearwire Corporation	Provider
Coaxial Cable TV Corp	Coaxial Cable TV Corp	Provider
Cogent Communications, Inc.	Cogent Communications, Inc.	Provider
Comcast	Comcast Cable Communications, LLC.	Provider
Consolidated Communications	Consolidated Communications	Provider
Conterra Ultra Broadband, LLC	Conterra Ultra Broadband Holdings, Inc.	Provider
Cricket Communications, Inc.	Leap Wireless International, Inc.	Provider
DBSi	DBSi	Provider
DEPOSIT TELEPHONE COMPANY, INC.	TDS TELECOM	Provider
Double Dog	Double Dog	Provider
EagleZip.com	EagleZipCom LLC	Provider
Evenlink	Evenlink	Provider
First Telecom Services, LLC	First Telecom Services, LLC	Provider
Frontier Communications	Frontier Communications	Provider
Frontier Communications of Breezewood	Frontier Communications	Provider
Frontier Communications of Canton	Frontier Communications	Provider
Frontier Communications of Oswayo	Frontier Communications	Provider
Gap CableTV	Gap CableTV	Provider
Getwireless.net, Inc.	Getwireless.net, Inc.	Provider
Hancock Telephone Co	Hancock Telephone Co	Provider
Hickory Telephone Company	Hickory Telephone Company	Provider
Hometown Utili-com	Borough of Kutztown	Provider
HughesNet	Hughes Communications, Inc.	Provider
Hydrosoft Internet	Hydrosoft Internet	Provider
ICDC Wireless Inc.	ICDC Wireless Inc.	Provider
In the Stix Broadband, LLC	In the Stix Broadband, LLC	Provider
Innernet, Inc.	Innernet, Inc.	Provider
Interlync Internet Sevices, Inc.	Interlync Internet Sevices, Inc.	Provider
Ironton Telephone Co	Ironton Telephone Co	Provider
KCnet	Keystone Community Network, Inc.	Provider
Kuhn Communications	Kuhn Communications	Provider
Lackawaxen Telephone Co	Lackawaxen Telephone Co	Provider
Lantek	Lantek	Provider

Filling Combany DBA	Filling Company Name	Status
Laurel Highland Telephone Company	Laurel Highland Telephone Company	Provider
Level 3 Communications, LLC	Level 3 Communications, LLC	Provider
MAHANOY & MAHANTANGO TELEPHONE COMPANY	TDS TELECOM	Provider
Marianna and Scenery Hill Telephone Company	FairPoint Communications	Provider
Matrix Telecom, Inc. (TRINSIC, powered by Matrix)		Provider
MegaPath Corporation	MegaPath Corporation	Provider
Metrocast Cablevision	Metrocast Cablevision	Provider
MetroCast Communications	Gans Communications, LP	Provider
Navpoint Internet	Navpoint Internet	Provider
Netcarrier Telecom, Inc.	Netcarrier Telecom, Inc.	Provider
Netconex	Netconex	Provider
Nittany Media, Inc.	Nittany Media, Inc.	Provider
Noroc Broadband	Noroc Broadband LLC	Provider
North Penn	North Penn	Provider
One Communications	One Communications	Provider
PaCLEC Corporation	PaCLEC Corporation	Provider
Palmerton Telephone Co	Palmerton Telephone Co	Provider
Pennsylvania Telephone Co	Pennsylvania Telephone Co	Provider
Pitcairn Cable	Pitcairn Cable	Provider
Pymatuning Indep. Tel. Company	Pymatuning Indep. Tel. Company	Provider
QCOL, Inc	QCOL, Inc	Provider
RCN and RCN Business Services	RCN Telecom Services of Philadelphia, Inc.	Provider
RCN and RCN Business Services	RCN Telecom Services, Inc.	Provider
Service Electric Cable TV, Inc.	Service Electric Cable TV, Inc.	Provider
Service Electric Cablevision, Inc.	Service Electric Cablevision, Inc.	Provider
Shen-Heights TV Associates, Inc.	Shen-Heights TV Associates, Inc.	Provider
Sidera Networks	Sidera Networks, LLC	Provider
Skycasters	Skycasters, LLC	Provider
Smoothstone IP Communications	Smoothstone IP Communications	Provider
South Canaan Telephone Company	South Canaan Telephone Company	Provider
Sprint	Sprint Nextel Corporation	Provider
StarBand Communications Inc.	StarBand Communications Inc.	Provider
StarLinX Technical Services	StarLinX Technical Services	Provider

Filling Combany DBA	Filling Company Name	Status
Sti Wireless	Sti Wireless	Provider
Sting Communications	Sting Communications	Provider
SUGAR VALLEY TELEPHONE COMPANY	TDS TELECOM	Provider
Tele-Media	Tele-Media Company of Zion, LLC	Provider
Telnes Broadband	Telnes Broadband	Provider
The North-Eastern Pennsylvania Telephone Company	The North-Eastern Pennsylvania Telephone Company	Provider
Time Warner Cable	Time Warner Cable LLC	Provider
T-Mobile	T-Mobile USA, Inc.	Provider
Towerstream Corporation	Towerstream Corporation	Provider
USA Choice Internet	USA Choice Internet Services Company, LLC	Provider
Venus Telephone Corporation	Venus Telephone Corp.	Provider
Verizon Pennsylvania Inc.	Verizon Pennsylvania Inc.	Provider
Verizon Wireless	Cellco Partnership and its Affiliated Entities	Provider
Wave2Wave Communications	Wave2Wave Communications, Inc.	Provider
Wavecrazy	Wavecrazy	Provider
West Side Telecommunications	West Side Telephone Company	Provider
Western PA Internet Access		Provider
WestPAnet	WestPAnet	Provider
WildBlue Communications, Inc.	ViaSat	Provider
Windstream	Windstream Pennsylvania, Inc	Provider
Wire Tele-View Corp.	Wire Tele-View Corp.	Provider
World ConnX	World ConnX	Provider
XO Communications Services, Inc. (Affiliated Entity)	XO Communications, LLC	Provider
Yukon Waltz Telephone Company	Yukon Waltz Telephone Company	Provider
Zito Media	Zito Media, L.P.	Provider
Airespring, Inc.	Airespring, Inc.	Reseller
ALs Satellite	ALs Satellite	Reseller
Beacon Technologies	Beacon Technologies	Reseller
Computer Solutions, Inc.		Reseller
Cyberonic Internet Communications, Inc.		Reseller
Drizzle		Reseller
Hans Cedardale Satellite Inc.	Hans Cedardale Satellite Inc.	Reseller
IPNS		Reseller

Filling Combany DBA	Filling Company Name	Status
Juno Online Services, Inc.		Reseller
NetZero, Inc.		Reseller
New Edge Network, Inc.	Earthlink	Reseller
New Edge Network, Inc.	New Edge Holding Company	Reseller
Reliable ISP Solutions "RISP"		Reseller
Satellite Internet Broadband	Satellite Internet Broadband	Reseller
Telefonica USA		Reseller
TOAST.net	TOAST.net	Reseller
Tracon Telecom		Reseller
Virtuallycheap Internet Services		Reseller

OFFICIAL APRIL 2013 UPDATE SUBMISSION TO THE NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION UNDER THE STATE BROADBAND INITIATIVE GRANT PROGRAM FOR THE COMMONWEALTH OF PUERTO RICO



CONNECT PUERTO RICO®

April 1, 2013

TABLE OF CONTENTS

April 1, 2013

Ms. Anne W. Neville
SBI Grant Program Director
National Telecommunications and Information Administration
U.S. Department of Commerce
Room 4716
1401 Constitution Avenue, NW
Washington, DC 20230

Dear Ms. Neville:

Connected Nation is pleased to present this submission on behalf of the Designated Entity, the Puerto Rico Office of the Chief Information Officer, and the Commonwealth of Puerto Rico's State Broadband Initiative (SBI) Grant Program, known as Connect Puerto Rico.

Connected Nation and Connect Puerto Rico congratulate the National Telecommunications and Information Administration (NTIA) and the Federal Communications Commission (FCC) on achieving the two-year anniversary of the National Broadband Map. Truly, now more than ever, the significance of complete and validated data through this effort is impacting lives in communities all across our great country. The Connect Puerto Rico program and its collective stakeholder community continue to be faithful and energized contributors, and we are proud to play such a part in forging the innovation economy of the twenty-first century.

The artifacts that comprise this submission should be found to be compliant with the April 1, 2013, deadline for the semi-annual data update and in accordance with the terms of the July 1, 2009, Notice of Funds Availability (NOFA) and all subsequent clarifications pertaining to delivery of territory-level mapping of broadband service availability. This packet includes:

Inventory of Deliverables, Connect Puerto Rico: April 1, 2013

NOFA Requirement	Data Transfer Model	Data Description
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in Census Blocks of No Greater Than Two Square Miles in Area
Appendix A: 1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census Blocks Larger in Area Than Two Square Miles

Appendix A: 1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address
Appendix A: 3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points
Appendix A: 4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing
Appendix A: 4	n/a	Community Anchor Institutions-Narratives
VII.A.1(a)	n/a	Accuracy and Verification Report
n/a	DataPackage.xlsx	Worksheets of Contact Information, Record Count, and Provider Summary Table
n/a	n/a	List of Changes and Corrections to the Dataset
n/a	n/a	Broadband Provider Roster and Participation Status

In addition, this data update submission should be found to be compliant with the additional program requirements instituted by the National Telecommunications and Information Administration since the time of the October 2012 SBI data submission for the Connect Puerto Rico program. Specifically, these new requirements are:

SBI Data Transfer Model
The submission of the broadband dataset for April 1, 2013, is contained within the SBI Data Transfer Model as released on the Grantee Workspace on December 14, 2012. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information on each provider as possible.

Additional Submission Guidance
On February 8, 2013, NTIA released new guidance regarding the processing of wireless data, for both fixed and mobile broadband providers. All wireless provider coverage records have been reviewed and are in compliance with this grantee guidance for this April 2013 submission period. Even providers that did not have an update for this submission cycle were reviewed and data reprocessed as necessary for those records that were not yet in compliance with the new guidance.

This submission continues to follow the speed technology guidance released by the Program Office on August 9, 2012, to review speed tier codes in correspondence with technology of transmission codes. In the October 2012 submission, descriptions were provided in the methodology paper that offered an explanation for any submitted technology of transmission and speed combinations that were outside of the expected value range. That practice continues in this submission as technology and speed combinations are reviewed

and scrutinized; any questionable information supplied by providers is reviewed more in depth with the provider to ensure the information is accurately captured or a proper explanation is provided as to why the speed information should be submitted as supplied even if it falls outside the expected value range.

This April 2013 semi-annual data update under the SBI Grant Program continues to demonstrate our dedication to implementing the joint purposes of the Recovery Act and the Broadband Data Improvement Act (BDIA) by gathering comprehensive and accurate territory-level broadband mapping data, developing territory-level broadband maps, aiding in the development and maintenance of the National Broadband Map, and undertaking territory-wide initiatives for broadband planning.

Broadband Service Availability — Provider Outreach and Verification

This data update submission under the SBI program includes datasets for 90.48 percent of the Puerto Rico provider community, or 19 of 21 total providers. Of the 19 participating providers, 11 supplied an update to their network or coverage area(s), while 6 have reported no change. The remaining 2 represent providers who previously supplied data but were non-responsive in the April 2013 update effort; therefore, their previous dataset is being put forward as part of this compilation. A complete roster by provider depicting participation status and contact history is contained herein. The remaining 2 providers that are not represented in the attached datasets are currently in some form of progress toward data submission but were not able to submit coverage areas at the time of this submission.

As the aforementioned roster and attached methodology documentation will attest, it is the collective opinion of the Connect Puerto Rico principals that all commercially reasonable efforts were made to account for 100 percent of the known Puerto Rico broadband provider community, pursuant to this semi-annual data update submission.

Connect Puerto Rico has also continued to perform broadband verification activities through several means. In addition to confirmation of service area(s) by each provider, Connect Puerto Rico conducts field validation efforts. To date, 12 (57.14 percent) providers have been validated through field verification activities. Additional details on verification activities are contained within the Field Validation Methodology.

The Connect Puerto Rico website, (www.connectpr.org), continues to serve a prominent role in the outreach and data collection effort. This program asset provides a way for the general public to participate in the process by offering interactive tools for users to test their connection speed, submit broadband inquiries, or contact a program representative.

As an indicator of stakeholder penetration, the Connect Puerto Rico website encountered 2,427 unique visits during this reporting period (18,573 total to date for the life of the grant awarded on December 20, 2009. Additionally, this pronounced Web activity netted 1 broadband inquiry over this same reporting period (78 grant inception to date). The website also provides access to the My

ConnectView™ interactive mapping application, which allows consumers and broadband providers to confirm or dispute the coverage represented on the broadband inventory map. These consumer-initiated actions are facilitated through the Connect Puerto Rico website and the Connect Puerto Rico interactive mapping tool (My ConnectView™) that offer the stakeholders the vehicles to provide information regarding availability in their respective service area, either in affirmation or contest of the reported data represented in the Connect Puerto Rico mapping artifacts. Since the initial data collection and release of corresponding maps, feedback in the form of broadband inquiries has allowed Connect Puerto Rico to identify additional areas that are in need of field validation, which is scheduled as soon as possible.

Community Anchor Institutions

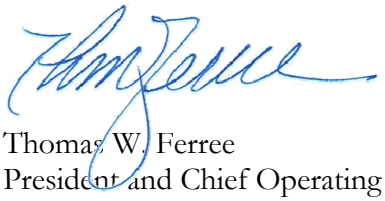
Connect Puerto Rico continues to make significant inroads to gather data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. This uptick in CAI data collection was further supported by NTIA's outreach to grantees reiterating the importance of this outreach. With the continued commitment of the Puerto Rico Department of Commerce, Community and Economic Development, we have continued to focus on a relationship-oriented approach with territory-level agencies and organizations that generates more responses than general contact.

In conjunction with the Puerto Rico Department of Commerce, Community and Economic Development, outreach was conducted during this data update reporting period by Connect Puerto Rico to continue identification of existing, centralized sources for CAI connectivity data. Additionally, outreach was coordinated to distribute the CAI survey to institutions throughout the commonwealth through multiple methods including a customized online survey available on the Connect Puerto Rico website. Building on past success of the September 2012 Education Campaign, February 2013 was recognized as Public Safety Month where the public safety sector was the focus of CAI data collection, research, and public affairs outreach. Connect Puerto Rico has developed a number of new relationships with associations such as the Association of Private Education in Puerto Rico and Dreyfous & Associates, to promote the importance of broadband connectivity at anchor institutions and participation in this data collection process. The value of these relationships continues to impact the entire success of the Grant Program, and the CAI engagement is a logical extension of new and existing relationships. Connect Puerto Rico will continue to build upon these new relationships over the coming months and utilize its contacts throughout the commonwealth to collect data and raise awareness of this project.

From our work in Puerto Rico, as well as other states, we recognize the great value of this data to future collaboration efforts within the commonwealth as well as its value to the National Broadband Map. We plan to continue to bring best practices to the Connect Puerto Rico efforts, along with an investment of both human and technical resources required to reach our goal of increasing the data that is secured and reported as part of this process.

The Connect Puerto Rico program exists to improve data on the deployment and adoption of broadband services and to assist in the extension of broadband technology across all regions of the great commonwealth of Puerto Rico, as well as the United States and its other territories through contribution to the National Broadband Map. We look forward to the continuing work ahead and improving upon our data collection methods.

Respectfully submitted,



Thomas W. Ferree
President and Chief Operating Officer
Connected Nation, Inc.

cc: Giancarlo Gonzalez, Chief Information Officer
Government of Puerto Rico

PUERTO RICO COMMUNITY ANCHOR INSTITUTIONS METHODOLOGY

In this seventh reporting period of the SBI, Connect Puerto Rico, working in close coordination with the Puerto Rico Office of the Chief Information Officer, has established an ongoing mechanism for gathering data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. Since the October 2012 data submission, the CAI outreach process method has been modified to improve data collection. Specifically, the outreach process is a more focused sector-specific and relationship-oriented approach that generates more responses than general contact.

Connect Puerto Rico has continued to identify and process CAI data obtained through an ongoing island-wide outreach campaign. Physical address information continues to be augmented through manual sourcing and geocoded by Connect Puerto Rico through Esri ArcGIS software.

Connect Puerto Rico continues to utilize a customized online survey hosted through SurveyMonkey, with a landing page on the Connect Puerto Rico website that was developed during the first reporting period. This survey, in combination with a customized data-gathering spreadsheet, was distributed on a regular basis to a targeted list of CAI throughout the Commonwealth as well as organizations and agencies that work closely with the CAI. The distributions were completed with the support of the client. Connect Puerto Rico will continue to use these data-gathering tools for future targeted outreach efforts throughout the coming months leading up to the next reporting period. These materials are customized to fit the CAI categories as defined in the SBI NOFA.

The survey can be accessed at this link: http://www.surveymonkey.com/s/RGLRB9D.

In addition to the survey, Connect Puerto Rico has developed a number of new relationships with associations across the territory, such as the Association of Private Education in Puerto Rico and Dreyfous & Associates, to promote the importance of broadband connectivity at Community Anchor Institutions and participation in this data collection process. It is apparent that these relationships are beneficial to the entire success of the grant program, and the CAI engagement is a logical extension of new and existing relationships. Connect Puerto Rico will continue to build upon these new relationships over the coming months and utilize its contacts throughout the territory to collect data and raise awareness of this project.

In addition to fostering and building relationships with local agencies, associations, and organizations, Connect Puerto Rico has also developed a sector-specific calendar that supports CAI outreach as well as research and communications efforts. This focused approach allows a corporate commitment to capturing CAI data in addition to developing meaningful sector-specific content. Since the October 2012 submission, the sector-specific approach included a month-long public safety campaign in February 2013. During this campaign, Connect Puerto Rico committed to improve relationships with key stakeholders, distribute survey requests to sector representatives, and provide sector-specific education through communications and webinar resources. Outreach to and survey of hospitals, local law enforcement, and fire stations helps build awareness and establishes a centralized database of key connectivity data for planning.

Connect Puerto Rico conducts significant research as part of an ongoing process to identify existing, centralized sources for CAI connectivity data. In tandem with these efforts to identify existing data, Connect Puerto Rico continues to identify key CAI contacts in an effort to distribute and promote the online survey and raise awareness of the importance of CAI broadband connectivity. Also, when possible, Connect Puerto Rico works with the Puerto Rico Office of the Chief Information Officer to identify existing relationships that can support CAI outreach.

Connect Puerto Rico has an ongoing mission to educate CAI throughout the island on the importance of participating in the project. Participation by these institutions will raise awareness about the importance of broadband connectivity and the need to report the requested data for inclusion on the National Broadband Map.

The greatest challenge with collecting CAI data continues to be educating the CAI about the Connect Puerto Rico project as well as self-awareness of their own broadband connectivity (specifically upload and download speeds). Connect Puerto Rico will continue to research key CAI organizations and agency contacts in an effort to raise awareness of this project among CAI. When applicable, the Puerto Rico Office of the Chief Information Officer will continue to be briefed on the current CAI data and provided information so it can assist with outreach and promotion within the Commonwealth.

A CAI summary of all processed and submitted data is provided below:

During the coming months, CAI data collection will be supported by regular reporting to the Connect Puerto Rico team. The CAI data is proving an invaluable resource to all components of the Connect Puerto Rico effort. The data identifies potential local champions, sector trends, and opportunities for improvement as well as opportunities to educate CAI not familiar with their current connectivity.

CAI Type	Total	Physical Address	Lat/Long	Technology of Transmission	Download Speed	Upload Speed
K-12 Schools	2023	2020	1724	1543	1505	1504
Libraries	216	215	153	2	1	1
Healthcare	624	623	139	4	4	4
Public Safety	302	301	274	21	15	11
Higher Ed Institutions	602	602	143	26	20	20
Other Government	129	129	122	0	59	45
Other Non-Government	1591	1530	979	8	5	5
Total	5487	5420	3534	1604	1609	1590

SBI Data Submission Methodology

The submission of the broadband dataset for April 1, 2013, is contained within the SBI Data Transfer Model and additional components as released on the Grantee Workspace on December 14, 2012. Connected Nation (CN) has reviewed all literature that relates to the release and use of this data transfer model and recognizes that it does not replace or dictate how data is stored, processed, or displayed for the state, as it is meant primarily as a means to transfer the broadband data from all states and territories and populate the National Broadband Map in a seamless fashion.
Connected Nation has complied with the following guidance documents published by NTIA:

- Technical Mapping Guide, as released on the Grantee Workspace on March 24, 2011, was followed to ensure the completeness and validity of the submission through completion steps and checklists, completing the DataPackage spreadsheet, uploading broadband datasets into the Data Transfer Model, and checking the dataset using the SBDD_CheckSubmission receipt process.
- Naming Conventions and Category of End User, as released on the Grantee Workspace on March 26, 2012, was followed to ensure the consistency of individual file and zip package naming.
- Wireless Data Processing Guidance, as sent to SBI grantees on February 8, 2013, was followed to ensure that all fixed and mobile wireless provider coverage records are submitted to NTIA as separate, closed polygons whenever there is a variation in any of the required fields.

In addition to the methodologies contained herein, the Changes and Corrections documentation, as well as the DataPackage.xls containing contact information, the data dictionary, and a provider summary table, the following feature classes are submitted within the SBI Data Transfer Model for the Commonwealth of Puerto Rico.

Inventory of Deliverables, Connect Puerto Rico: April 1, 2013

NOFA Requirement	Data Transfer Model	Data Description
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in Census Blocks of No Greater Than Two Square Miles in Area.
Appendix A: 1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census Blocks Larger in Area Than Two Square Miles.
Appendix A: 1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address.
Appendix A: 3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points.

Appendix A: 4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing.

The provider data collected by CN on behalf of the Commonwealth of Puerto Rico have been formatted per the given specifications and uploaded into the appropriate feature classes of the SBI Data Transfer Model. Wireline availability is contained within census blocks and road segments, wireless availability is contained as polygons of coverage areas, and middle-mile connections and Community Anchor Institutions are contained as point data. All speed data is contained at the census block, road segment, or wireless polygon level of availability. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information as possible.

Connected Nation has continued outreach to satellite providers on their availability, technology, and speed information, but granular coverage is not yet available. Submitted within the wireless feature class are the satellite companies providing service to Puerto Rico as a polygon of the territory boundary. Efforts will continue to collect, process, or otherwise create more granular satellite data based on availability analyses and guidance received from NTIA. Process development continues as well to be able to create more granular satellite coverage based on satellite equipment positioning and geographic inputs.

PUERTO RICO FIELD VALIDATION METHODOLOGY

CN focused a portion of its time on specific validation processes such as:

- conducting random spectrum analysis studies throughout the territory using an Avcom PSA-37-XP spectrum analyzer;
- conducting mobile speed tests throughout the territory using an iPhone, Android (or other smart phone) as well as provider-specific aircards (Sprint 3G/4G, Clearwire et al);
- identifying pre-selected, provider-submitted wireless transmit tower sites and cross-referencing data about that tower against the Federal Communications Commission (FCC) databases such as Antenna Structure Registration and/or the Universal Licensing System;
- cross-referencing Federal Registration Number data against available FCC Form 477 data as well as the FCC **CO**mmission **RE**gistration **S**ystem (CORES);
- validating provider submitted data (for example: latitude/longitude) using a handheld Garmin eTrex Summit GPS unit or GPS enabled software such as Microsoft *Streets & Trips*;
- locating physical wire-line attributes (such as Central Offices, Remote Terminals, CATV plant, etc.) and comparing them against provider submitted data; and
- conducting on-net and off-net speed tests using the FCC portal at http://www.broadband.gov/qualitytest/about/ or using the Ookla Net Metrics enabled speed test utility located on each of CN's program specific websites.

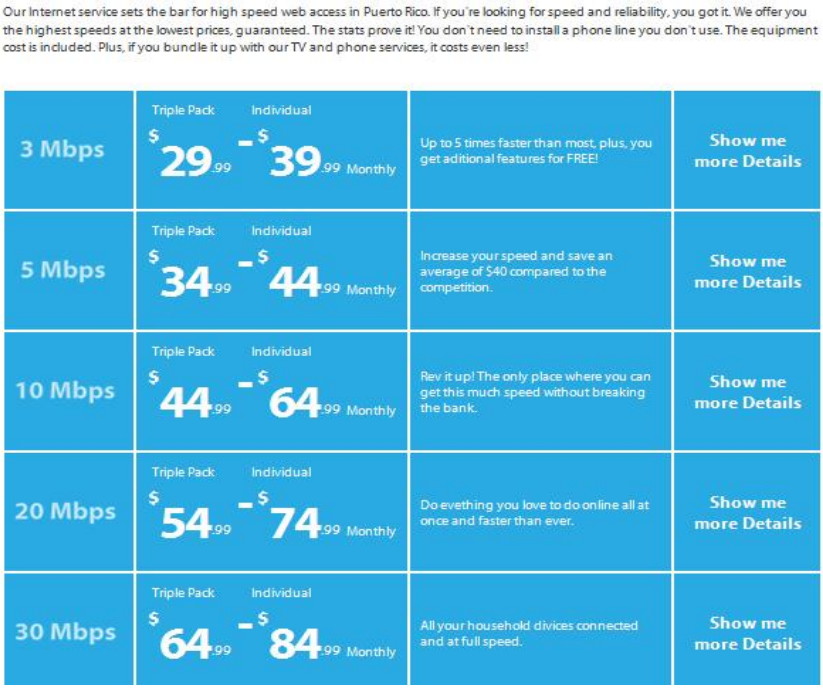
Additionally, CN cross-referenced numerous public documents in order to ensure that all known broadband providers were located and contacted. This included searching membership logs from trade associations (WISPA, WCAI, PCIA, etc.), the Cable Television Fact Book, Public Utility Commission records, Public Service Commission records, Chamber of Commerce, etc.

To date, Connected Nation's staff conducted on-site validation tests in Puerto Rico on the following providers: Aeronet Wireless; AT&T; Critical Hub Networks; Choice Communications; Data@ccess; Liberty Cablevision of Puerto Rico (also d.b.a. OneLink); Neptuno Media; PR Wireless Inc.; Puerto Rico Telephone Company; Sprint; T-Mobile; and Worldnet.

From program initiation through this reporting period, CN has completed in-the-field validation testing against 12 companies (out of a universe of 21 viable providers) totaling 57.14 percent within the Commonwealth of Puerto Rico.

CN has also continued to review provider datasets for accurate speed information, platform listings, and other intricacies that may fall outside of the standard SBI Data Transfer Model parameters, as published on the NTIA Grantee Workspace on December 14, 2012. Any providers whose submitted coverage and attributes are anticipated to come into question have been further reviewed and confirmed; details on a case-by-case basis are presented below.

Liberty Global, Inc.
Issue: Technology of transmission code 40 with maximum advertised download speed in tier 8, lower than expected value range for the technology.
Resolution: Provider website advertises 30 Mbps service; screenshot below.



PROVIDER VALIDATION METHODOLOGY

Broadband providers maintain their service area data in many different formats, all in varying levels of complexity and granularity. In order to ensure that the data required by the NTIA is standardized across all providers and that it is as accurate as possible, CN translates and formats the data that providers are able to supply into a GIS shapefile and produces maps for the provider to review. The resulting map(s) and review process allow for providers to see their service area in a geographic format – for some providers, this is the first time they have seen maps of their broadband service area. Having the mapped service area allows providers to quickly identify any issues that appear in the data representation, whether the issue is in the data translation into a GIS format or from the original data collection and submission. Often data is provided from various sources and through the review and revision process, local engineers who operate the networks and work in the field are able to ensure that the tabular data that has been submitted is accurate and represents the real-world network extent. Any issues in how the service area is represented on the map(s) are remedied by CN, whether they are additions, removal of service, or any other revisions. Revised maps of service area representations are sent to the provider for review and approval; CN will revise data and return maps as many times as necessary until the provider is in agreement that the map represents their service area as accurately as possible. Once the review process has been completed and final approval of the data is provided, the data is deemed ready for NTIA submission.

Once the data collection has been aggregated at a territory-wide level, static maps of territory-wide and municipality-level availability are produced and made publicly available. In addition, consumers can visit the interactive online tool, My ConnectView, to create customized views of broadband service areas and analyze corresponding demographic information. Leveraging broadband service data on various platforms allows for public users, providers, and other stakeholders to review, scrutinize, and provide feedback on the represented data. This feedback becomes a validation method in itself, as consumers submit inquiries to CN either affirming where service is not available or identifying areas where broadband service is shown on the map, but in actuality is not available. This allows for a follow-up to providers regarding revisions to the data as it is represented; it also allows for CN to identify locations where on-site visits may be necessary to complete field validation of available services. Public feedback on all forms of mapping products serves as a localized validation method for provider-supplied information and allows CN to resolve inaccuracies as they are identified to ensure that only the highest quality information is provided to stakeholders.

Estimates derived from provider-validated data indicate that approximately 10.34 percent of Puerto Rico households do not have terrestrial fixed broadband service available, and approximately 0.18 percent of Puerto Rico households have neither mobile nor fixed broadband service available.

Within rural areas of the territory, results derived from provider-validated data indicate that approximately 16.58 percent of rural Puerto Rico households do not have terrestrial fixed broadband service available, and approximately 0.22 percent of rural Puerto Rico households have neither mobile nor fixed broadband service available. Please note that the availability estimates presented are based on Census 2010 household information.

The estimates above, in accordance with NTIA's definition of available broadband service as specified in the SBI NOFA, include broadband service with download speeds of at least 768 Kbps and upload speeds greater than 200 Kbps.

In addition, due to the nature of the SBI data collection methodology as defined by the NTIA and based on both census block geographic units and street segment data, the estimates of broadband availability derived from provider-validated data may include an overstatement of the actual number of households with broadband availability. Under the census block-based data collection method, a provider will typically report broadband availability for an entire census block whether its network is present across the whole or only a subset of that census block. This potential overestimation at the census block level can be amplified as the data is aggregated across the entire island.

WIRELESS METHODOLOGY

Broadband Service Availability in Provider's Service Area
Wireless Services Not Provided to a Specific Address

Data solicited from a fixed wireless provider to create propagation models include, but are not limited to:

1. The name of the structure.
2. Whether the transmitting device is operational or proposed.
3. The maximum advertised downstream speed, the maximum advertised upstream speed.
4. The typical downstream speed, the typical upstream speed (peak periods for both).
5. The frequency range of spectrum being used (as prescribed by NTIA). This may include (but is not limited to) spectrum authorizations identified within the Federal Communications Commission (FCC) Universal Licensing System (ULS) database or located on the FCC's Spectrum Dashboard.
6. The primary population center(s) being served (for geopolitical boundary reference).
7. The physical address of the transmit site (in the event latitude/longitude is unavailable from the provider this allows a quick reference point for geocoding).
8. Latitude in either Degrees, Minutes, and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
9. Longitude in either Degrees, Minutes and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
10. Antenna pattern (e.g. omnidirectional, 180°, 120°, 90°, etc.).
11. Azimuth of antenna (e.g. 360° with magnetic declination if known).
12. Approximate transmit radius (in feet, miles, or kilometers).
13. Polarity of transmit antenna (Vertical or Horizontal).
14. Transmit antenna gain (in dBi).

15. Line loss (applicable only to providers using coax, heliax, waveguide or other forms of cabling – excludes power-over-Ethernet devices).
16. Mechanical and/or Electrical beam tilt (if applicable).
17. Equipment Manufacturer (allows easy cross-reference against manufacturer's specification sheet).
18. Power output of the transmitting device (if unknown, FCC standards or manufacturer specifications are applied).
19. AMSL at base of tower site.
20. Antenna centerline AGL (height of antenna above ground level measured at the centerline of the actual antenna).
21. Foliage factors (Evergreens/Deciduous and percent of ground cover).
22. Ground Clutter (primarily used in rural areas to account for foliage and in metropolitan areas to account for types and heights of buildings if known).
23. Average gain of receive antenna.
24. Receive antenna is estimated at height above average terrain (HAAT) of 6.2 meters/20 feet.
25. Federal Registration Numbers (if applicable) which may allow opportunities to cross-reference and/or obtain additional data from the FCC's ULS and the **CO**mmission **RE**gistration **S**ystem.

Propagation modeling combines scientific data and empirical mathematical formulation for the characterization of radio wave propagation as a function of frequency, distance, and other conditions. Propagation software(s) typically use the Irregular Terrain Model (also known as Longley-Rice) of radio propagation for frequencies between 20 MHz and 20 GHz. This model is based on electromagnetic theory and statistical analyses of the combination of terrain features and radio measurements, then predicting the median attenuation of a radio signal as a function of distance and the variability of the signal in time and in space. For metropolitan areas, the software can typically be adjusted to use the Okumura-Hata model, which accounts for predicting the behavior of cellular transmissions in areas where buildings are the primary obstructions. The resulting product from either model depicts a graphical illustration of the theoretical propagation characteristics of a selected frequency range based on defined variables (receiver sensitivity of the home/mobile device, foliage factor, and digital elevation terrain input).

After converting propagation models into a geospatial format, additional processing is completed to remove the small pixels representing service present in the resulting dataset. These areas are initially created based on the parameters entered in the software from the provider equipment information, the underlying data parameters of elevation, hill shade, etc., and the limitations of the software itself to display a broadband service area as accurately as possible. Generally, these random pixel striations appear as a result of signal levels reaching the highest elevated points within the prescribed radius. Typically, while this pixilation anomaly shows legitimate areas where signals can be received, these highly elevated points may have exceedingly sparse populations or are entirely void of population. As a result, and congruent to the *Wireless Technology Methodologies and Business Logic* white paper

submitted to NTIA on January 20, 2011, all independent pixels representing service that are less than 0.125 square miles in area have been removed from the geospatial representation of each wireless provider.

BROADBAND INQUIRIES METHODOLOGY

CN collects consumer feedback in the form of broadband inquiries (BBIs). These inquiries represent any type of communication received from the public regarding broadband service. Once BBIs are received across the state, this information is overlaid with the broadband availability information which was collected through the SBI program. This allows for a real-world comparison of the broadband landscape to the information received from broadband inquiries. Consumers submitting these inbound comments and/or inquiries are able to provide information regarding five categories: 1) residents who do not have broadband but want it; 2) residents who have broadband but want a different provider; 3) residents who do not have broadband, but the broadband inventory maps indicate that they do; 4) residents who have broadband but want a faster connection speed; and 5) residents who have broadband but want a less expensive service option.

BBIs are submitted frequently by consumers via the Connect Puerto Rico website. Inquiries often seek help to identify local broadband provider options, or to learn when a specific provider may be able to provide service to that consumer. Consumer comments also provide information which may help modify maps with actual service area information. The primary objectives of CN regarding these inquiries are 1) to improve the accuracy of the state maps with submitted consumer information and follow-up field research; 2) to provide broadband options to consumers through cooperation with mapped providers and by facilitating new broadband service options; and 3) to map and analyze information from consumers about areas of unmet broadband demand and alternatives to currently mapped services. A prime example of the second option is the utilization of the Rural Utility Service satellite eligibility tool. By simply entering the consumer's address, the CN engineer can quickly determine if the consumer meets the initial qualification status for BIP satellite subsidies.

New BBIs are assigned to either the GIS department or the Engineering & Technical Services (ETS) team depending on the category entered by the consumer on the website submission form. The GIS or ETS team members respond to each inquiry according to the information entered by the consumer. Many BBIs can be resolved through desktop research; however, if a BBI requires research in the field, the assigned ETS team member conducts such research when performing field validations in the area of the inquiry, or at another such time as is practical and appropriate. GIS and ETS team members respond to and conclude BBIs via telephone contact and/or e-mail communication.

The broadband inquiry process has been implemented in each of the CN state programs with successful results. Altogether CN has received over 18,839 broadband inquiries since 2007, allowing the state programs to evaluate each inquiry for broadband demand and data verification. These inquiries are continuously examined against current broadband availability, updated every six

months, to determine if previously unserved households have been expanded to and can now receive broadband at their residence. This database of broadband inquiries has also allowed the CN state programs to aggregate demand in concentrated areas to show providers the exact locations where the population has made it clear that they would purchase broadband if it was made available to them. Providers in the states have responded to this process and have expanded to areas knowing that their investment will be worthwhile. Data verification methods have also proven successful, as the state programs have been able to show those inquiries that indicate the broadband service areas are misrepresented on the map to providers, who then verify where service cannot reach in regard to that residence(s). The broadband coverage in these states has been altered to create a more accurate map based on the inquiries submitted by the public.

During this reporting period, the Connect Puerto Rico project has received 1 inquiry (78 grant inception to date). As more inquiries are submitted to Connect Puerto Rico, a more thorough validation of the broadband landscape can be performed, while also allowing providers to see which areas have a high demand for broadband adoption.

MY CONNECTVIEW METHODOLOGY

My ConnectView is an interactive online mapping tool for viewing, analyzing, and validating broadband data. Developed using Esri's ArcGIS for Server and Adobe's Flex Framework and hosted and maintained by Connected Nation, My ConnectView is a multi-functional, user-friendly way for local leaders, policymakers, consumers, and technology providers to devise a plan for the expansion and adoption of broadband.

First and foremost, My ConnectView allows consumers to locate their residence and identify providers that offer broadband Internet service to that location. The interactive platform allows for users to build and evaluate broadband expansion scenarios using a wealth of data, including several coverage analysis layers, speed analyses, Community Anchor Institutions, and tools to search and export household demographic information, as well as extract data in GIS, spreadsheet, and/or PDF formats.

My ConnectView also features more interactive data layers and additional tools than ever before to allow the consumer to explore the broadband data. My ConnectView provides consumers with the ability to print, e-mail, and provide feedback on the broadband data displayed on the interactive map. Through the collection of this feedback, a visual demand for broadband is presented. This visualization allows the CN state programs the ability to validate the broadband availability for accuracy. If residents within a region state they are without broadband, but the interactive map shows otherwise, this allows CN to approach the providers within that area in an effort to trim down their coverage to more accurately represent real-world availability on the ground.

The Connect Puerto Rico project launched My ConnectView on April 2, 2012, and has received 787 visits this reporting period; to date the interactive mapping application has received 2,807 visits.

SPEED TEST METHODOLOGY

The 229 speed tests that are represented in the Connect Puerto Rico Speed Test Report during this reporting period (1,636 grant inception to date) are the result of a partnership between CN and Ookla Net Metrics. Utilizing this relationship increases the level of confidence in the data being collected and provides for a far greater sample size than could be collected by a single testing site.

Ookla owns and operates Speedtest.net, as well as develops and deploys speed tests, such as the Connect Puerto Rico speed test website, for partners around the world. This network of sites that is developed and run on its testing technology provides Ookla with a vast dataset that, due to the variability of geographic information collected across the varying speed test sites, is geocoded utilizing Geo-IP technology. This technology allows for tests to be geocoded to points of aggregation, typically larger nodes across provider networks. While there are hundreds of thousands of tests that have been conducted, the level of aggregation is only sufficient for municipality-level detail due to the test results being located at these larger nodes and not at an absolute location for each speed test.

In an effort to validate broadband data from the Connect Puerto Rico project, speed test information is collected throughout the Commonwealth. Speed tests provide speed information on the path taken through all networks (a provider's network as well as additional networks) a local machine must connect to in order to reach the host test. The benefit of this collection of speed information is two-tiered. First, it allows for a comprehensive dataset of speeds, while also providing Connect Puerto Rico with the information on where broadband services are available. Second, unlike theoretical speed information which may be received through the data collection process, the use of speed tests provide real-world information on the speeds that currently exist within the Commonwealth of Puerto Rico.

PROVIDERS DEEMED NON-VIABLE

The following list of companies represents the remainder of the broadband provider universe that was originally identified as complete for outreach to begin for the State Broadband Initiative. These providers are not included in the Data Package for the April 2013 submission because they have been deemed non-eligible under the parameters and guidance of the SBI grant program. This list of companies includes, but is not limited to: providers offering service but below the current definition of broadband, those that have gone out of business, technology consulting firms, infrastructure or network construction companies, non-facilities based general resellers, etc.

	Company Name	URL	Comments
1	Adelphia	n/a	Acquired by another company; no longer in business.
2	Advance IP Applications, Inc.	www.advanceipapplications.com/	Data integrator and management company.
3	Advance Wireless Communications, Inc.	www.advancedwireless.com/	General distributor of radio equipment.
4	Affinity Mobile, LLC	www.affinitymobile.com	Inactive URL; out of business.
5	American Telephone Communication	www.americantel.com	General distributor of telephones and equipment.
6	Arroyo Calling Services	n/a	Prepaid phone services and pay phone distributor.
7	Atenas Internet	www.atenas.com/	General reseller of backhaul and dial-up; also offers B2B wireless services.
8	Broadband Internet Via Air	www.bivapr.net	BIVA assets acquired by Sprint and Clearwire; Inactive URL; no longer in business.
9	Centennial Communications Corporation	n/a	General reseller; acquired by AT&T.
10	Centennial de Puerto Rico	n/a	Acquired by AT&T.
11	Centennial Puerto Rico License Corp.	n/a	Acquired by AT&T.
12	Centro Beeper	n/a	Paging company.
13	Comunicaciones Tony Plaza, Inc.	n/a	Pay phone and prepaid services.
14	Cortelco Systems Puerto Rico, Inc.	http://cortelcopr.net/	Distributor of communications and billing systems.

15	Custom Teleconnect, Inc.	www.customteleconnect.com	US provider of operator support, domestic and international direct dial service, international callback and debit card services; also an independent pay phone provider (IPP) for the hospitality and tourism industries.
16	Datavos Corporation	www.datavos.com	Inactive URL; out of business.
17	DG-TEC Puerto Rico, LLC	n/a	Dominican-based VOIP and GSM provider; may now be out of business.
18	Empire Payphones, Inc.	n/a	Prepaid phone services and pay phone distributor.
19	Ernesto L. González Morales	n/a	Not a provider of broadband services.
20	Fibercrossing Corp.	www.fibercrossing.net	Went out of business in December of 2009.
21	Globalstar Caribbean, Ltd.	www.globalstarusa.com	Provider of satellite phones and SMS service.
22	Hibridos Telecommunications, Inc. (HIB)	www.hib.itgo.com	Puerto Rico-based CLEC; refused to participate.
23	Humacao Payphone	n/a	Prepaid phone services and pay phone distributor.
24	IDT Puerto Rico Co.	www.idt.net	Resells local and long distance phone services.
25	Intellicall Operator Services, Inc.	www.intellicalloperatorservices.com	Outsourced service solutions and U.S. call center facilities.
26	Level 3 Communications, LLC	http://www.level3.com/	No broadband services offered in the state.
27	Lightyear Alliance of Puerto Rico, LLC	www.lightyear.net	Nonfacilities-based general reseller.
28	MCI Communications Services, Inc.	n/a	Acquired by Verizon.

29	MCI International, Inc.	n/a	Acquired by Verizon.
30	MEG COMMUNICATION	n/a	No longer in business.
31	Metro Beeper, Inc.	www.metrobeeper.com	Paging company.
32	MG Communications	n/a	Prepaid phone services and pay phone distributor.
33	Moises Sierra Fernandez	n/a	Not a provider of broadband services.
34	Network Communications International Corp.	www.ncic.com	Inmate telephone services, pay phone services, and directory assistance and reseller of prepaid minutes.
35	Network Operator Services, Inc.	www.centrisinfo.com	U.S. provider of operator support, domestic and international direct dial service, international callback and debit card services; also an independent pay phone provider (IPP) for the hospitality and tourism industries.
36	Neutral Tandem-Puerto Rico, LLC	www.neutraltandem.com	Provides tandem services for wholesale long distance, local transit, and international long distance.
37	Next G Network of NY, Inc.	n/a	System integrator.
38	North Sight Communications, Inc.	www.northsite.com	Was an iDEN provider in Puerto Rico; URL no longer works; may have been acquired by Proxtel Wireless.
39	Optivon Telecommunications Services, Inc.	www.optivonpr.com	Nonfacilities-based general reseller.
40	Orizon Wireless Corp.	n/a	No longer in business, contacts and website decommissioned, all licensed point-to-point authorizations now terminated by the FCC.

41	Pan American Telephone Co., PR, LLC	n/a	Hispanic-owned political consulting, public affairs, communications and business development firm on Long Island.
42	Payphone Telecom	n/a	Prepaid phone services and pay phone distributor.
43	Phoneworks, Inc.	n/a	Pay phone services and distributor.
44	PR Pronto Telecommunications Corp.	n/a	An international word-of-mouth marketing agency.
45	Primus Telecommunications Group, Inc.	www.ptgi.com//docs/factscaribbean.html	Nonfacilities-based general reseller and CLEC.
46	Qwest Communications Company, LLC	n/a	Acquired by CenturyLink.
47	San Juan Gas Acquisition Corporation, (SAC)	n/a	Gas and propane company with offshore communications.
48	STSJ Overseas Telephone Company, Inc.	n/a	Facilities-based long distance carrier; offers direct dial, toll-free long distance, calling and debit cards, international toll-free service and 24-hour bilingual operator services; does not offer broadband.
49	Tatiana C. Velázquez Roza	n/a	Not a provider of broadband services.
50	T-Mobile Puerto Rico, LLC	n/a	Holding company for T-Mobile; registered with JRT.
51	Tricom USA, Inc.	www.tricomusa.net	Specializes in the installation of any voice, data, and fiber cabling, from new construction to additions.
52	Value Added Communications, Inc.	n/a	Inmate telephone services, pay phone services and directory assistance.
53	Verizon Wireless	n/a	Out-of-territory provider.

54	VoiceLan Group, Corp.	www.voicelangroup.com	Inactive URL; out of business.
55	VPNet, Inc.	www.vox-tel.com	Inactive URL; out of business.
56	WorldNet Telecommunications	n/a	CLEC and holding company for Worldnet.

APPENDIX A: BROADBAND PROVIDER LOG

Broadband Provider Log

Complete	24
Non-Responsive/Refused	0
In Progress	4
Reseller Providing Data	0
Count of Datasets by Status	**28**
Total Unique Providers Represented	**21**

Provider Name	Platform	Status	NDA Execution Date	Notes
AT&T Mobility LLC	Mobile Wireless	Data Added to Statewide Inventory	12/16/2009	[FEB-14-2013 Jess Cary] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Hughes Network Systems, LLC	Satellite	Data Added to Statewide Inventory	2/5/2010	[MAR-13-2013 Jess Cary] Change: Provider upgraded infrastructure and can now offer tier 7 download speeds and tier 4 upload speeds.
INTECO	Fixed Wireless	Data Added to Statewide Inventory	1/30/2012	[MAR-13-2013 Jess Cary] Correction: Initial submission of provider's Fixed Wireless coverage, but they were in service previously.
Liberty Global, Inc.	Cable	Data Added to Statewide Inventory	10/19/2009	[MAR-13-2013 Jess Cary] Change: OneLink was acquired by Liberty Global; provider expanded coverage area.
Puerto Rico Telephone Company Inc.	Mobile Wireless	Data Added to Statewide Inventory	4/23/2010	[MAR-13-2013 Jess Cary] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Puerto Rico Telephone Company Inc.	DSL	Data Added to Statewide Inventory	4/23/2010	[MAR-13-2013 Jess Cary] Change: Provider expanded coverage area.
Skycasters	Satellite	Data Added to Statewide Inventory	10/16/2012	[MAR-13-2013 Jess Cary] Correction: Provided coverage for first time but previously in operation.
Sprint Nextel Corporation	Mobile Wireless	Data Added to Statewide Inventory	1/14/2010	[FEB-14-13 Jess Cary] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
T-Mobile USA, Inc.	Mobile Wireless	Data Added to Statewide Inventory	1/8/2010	[FEB-14-2013 Jess Cary] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
XAirNet Corp.	Fixed Wireless	Data Added to Statewide Inventory		[MAR-13-2013 Jess Cary] Change: Provider added tower.
INTECO	Backhaul	Backhaul Provider Only Processing Complete	1/30/2012	
Neptuno Media, Inc.	Backhaul	Backhaul Provider Only Processing Complete	4/29/2010	
Sprint Nextel Corporation	Backhaul	Backhaul Provider Only Processing Complete	1/14/2010	
T-Mobile USA, Inc.	Backhaul	Backhaul Provider Only Processing Complete	1/8/2010	
Liberty Global, Inc.	Cable	Approval for Update Not Received – Data Still Submitted	10/19/2009	[FEB-14-2013 Jess Cary] Change: Expanded coverage area.
PR Wireless, Inc.	Mobile Wireless	Approval for Update Not Received – Data Still Submitted		[MAR-18-2013 Jess Cary] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Aeronet Wireless Broadband Corp.	Backhaul	No Update to Provide		
Data@ccess Communications	Backhaul	No Update to Provide	9/29/2009	
PREPA Networks LLC	Backhaul	No Update to Provide	4/21/2010	
Puerto Rico Cable Acquisition Company, Inc.	Cable	No Update to Provide	9/27/2010	
Spacenet, Inc.	Satellite	No Update to Provide		
Worldnet Telecommunications Inc.	Backhaul	No Update to Provide	4/19/2010	
Ayustar Corporation	Fixed Wireless	No Update Provided – Use Last Submission Data	7/12/2010	
Critical Hub Networks	Backhaul	No Update Provided – Use Last Submission Data	9/30/2010	
Critical Hub Networks	Fixed Wireless	No Update Provided – Use Last Submission Data	9/30/2010	
Critical Hub Networks	Fiber	No Update Provided – Use Last Submission Data	9/30/2010	
Aeronet Wireless Broadband Corp.	Fixed Wireless	Solicited Initial Data		
Puerto Rico Telephone Company Inc.	Fiber	Solicited Initial Data	4/23/2010	
Telefonica International Holding, BV	Backhaul	Solicited Initial Data		
WinPR, Inc.	Fixed Wireless	Solicited Initial Data		

Rhode Island
Broadband Mapping Project
March 2013 Data Submission -
Summary and Processes

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BBRI Broadband Rhode Island
An initiative of the RIEDC

RECOVERY.GOV

EA Engineering, Science, and Technology, Inc.

Section A: The Broadband Rhode Island Mapping Team Overview

In support of the national broadband initiatives undertaken by President Obama and the Federal Government through the American Recovery & Reinvestment Act of 2009 (Recovery Act), Public Law No. 111-5, and the Broadband Data Improvement Act (BDIA), title I of Public Law No. 110-385, 122 Stat. 4096, the Rhode Island Economic Development Corporation (RIEDC), as the entity assigned by former Governor Donald Carcieri, has been awarded grant funds from the United States Department of Commerce – National Telecommunications and Information Administration (NTIA) State Broadband Data and Development Grant Program.

Project Description

EA Engineering, Science, and Technology, Inc. (EA), has been selected by RIEDC, through their Broadband Initiative for Rhode Island (BBRI) to provide a data management and retrieval system for RIEDC. RIEDC and EA entered into a contractual agreement on January 15, 2010 for a base period of 2 (two) years with 3 (three) optional years. The work assignment consists of negotiating non disclosure agreements (NDA) with the State's broadband providers, collecting provider broadband data, verifying data submitted, combining and updating data collected, developing and implementing a broadband website with mapping application, and reporting findings to RIEDC and the NTIA.

This program has created a statewide broadband map which will be maintained for five (5) years, that assesses broadband infrastructure in Rhode Island and distinguishes between served, underserved, and un-served communities as per the definition specified by NTIA. The data has been made available to the public, with certain restrictions to account for confidentiality of supplier information, through a state website and is linked to a Federal Department of Commerce webpage. The goal of this project is to meet the RIEDC's broadband mapping needs and in doing so provide maps and information that will be used to lend guidance and assistance in the planning of future broadband infrastructure development, as well as provide numerous broadband options to the end users.

The BBRI is a comprehensive effort aimed at producing a high level of detailed inventory of broadband services provided to residential, government and business consumers within the State of Rhode Island. The project is not only a Geographical Information Systems (GIS) mission but a project that needs expertise in GIS, contracting and legal issues, Quality Assurance/Quality Control (QAQC), and project management. In order to acquire, collect, process, analyze and display the data that represents these services it was necessary to combine the resources of several professional firms. Each team member provides unique set of strengths and capabilities needed to create the system that is in place. The team is made up of Rhode Island Economic Development Corporation (RIEDC), EA Engineering (EA), University of Rhode Island (URI), Adler Pollock & Sheehan P.C. (AP&S), Eastern Shore Regional GIS Cooperative (ESRGC), and Mapping

& Planning Services (M&PS). As of the start of Quarter 1, Calendar year 2013, AP&S is no longer counsel of record for the BBRI initiative. This responsibility has been transferred to John H. McCann at the firm Shechtman, Halperin, Savage LLP.
The following paragraphs provide information on each team member and their role the project.

The RIEDC is leading the project efforts for the State of Rhode Island (RI). Led by Mr. Stuart Freiman, they oversee all facets of the project and teams involved. The RIEDC coordinates schedules, communicates directly with the National Telecommunications Information Agency (NTIA), reviews and approves all project deliverables, and ensure all project deadlines are met. With their high visibility in the RI business community they are instrumental in arranging meetings between broadband providers and BBRI Team members. The relationship and communication RIEDC has with the State's providers was and continues to be instrumental in making the process of collecting and verifying information from the providers as effortless as possible.

EA is the prime contractor selected to lead the State's data collection, verification, reporting, and mapping efforts. EA has been providing scientific and engineering technical solutions to a wide range of government and industrial clients since 1973. Serving IT and GIS solutions via the web has become a standard business solution for EA's clients. As the prime contractor EA works closely with the RIEDC on all phase of the BBRI project. Included in the work EA has done to date, is the creation of the State's broadband website and mapping application (Digital Atlas). The website provides information on the project, links to related sites, custom mapping capabilities, and user speed test and feedback forms. The site can be viewed at the following address; http://broadband.ri.gov/.

M&PS has been providing GIS consulting services in RI for over 20 years. For the RI Broadband Mapping project, M&PS assisted in the development of a verification and analysis process which is used to perform the QA/QC of the data prior to submitting to the NTIA. Prior to each bi-annual NTIA submittal M&PS uses this process to review and check the data. During this process MP&S checks for positional and attribute accuracy of the data by using a random sampling methodology. The service MP&S provides insures data going to the NTIA is of the highest accuracy and precision. Additional M&PS provides data analysis and static maps displaying the data status at each delivery date.

The GIS laboratory in the URI's Department of Natural Resources is the center of technical expertise in the GIS field for the State of RI. On this project URI manages all GIS data report by EA to the RIEDC. They also serve as an additional tier of QA/QC on the data that is collected and submitted to the NTIA. URI provides technical input to the data processes and the types of maps and data to be displayed on the website. Additionally, several data layers including Community Anchor Institute locations and base map layers being used on the Digital Atlas are provided by URI.

The Eastern Shore Regional GIS Cooperative (ESRGC) is an organization that provides technical support, training, and GIS services to local governments on the Eastern Shore of Maryland. In addition to supporting the BBRI project, ESRGC is leading the broadband mapping efforts for the state of Maryland. For the BBRI project, the ESRGC's provides the project team technical advisor support. They provide guidance on the project's technical approach and peer review support based on knowledge gained from their work in Maryland. ESRGC provided assistance in defining requirements for the QA/QC process, database design, and data verification tasks. The ESRGC provides the Team with a "lessons learned" from the Maryland Broadband project which guided the BBRI Team around common mistakes made on broadband mapping projects.

AP&S is a local RI law firm providing legal advice and representation and has been servicing RI residents and firms for 50 years. The role AP&S plays on this project is providing the necessary legal advice and contracting that is necessary between the RIEDC and the broadband providers. To date, AP&S has brokered the Non-Disclosure Agreements (NDA's) between the RIEDC and 16 broadband providers. These agreements were imperative and had to be in place before any data was submitted by the broadband providers. All provider broadband information that is made public is based on what the NDAs state. AP&S became the State's expert as to what information was legal for the team to make available to the public and modeled the NDAs off of the guidance provided in the NOFA.

As of the start of Quarter 1, Calendar year 2013, AP&S is no longer counsel of record for the BBRI initiative. This responsibility has been transferred to John H. McCann at the firm Shechtman, Halperin, Savage LLP.

Project Contacts

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BROADBAND PROVIDER DATA VERIFICATION REPORT
RHODE ISLAND DATA SUBMITTAL #6
MARCH 29, 2013

General Findings:

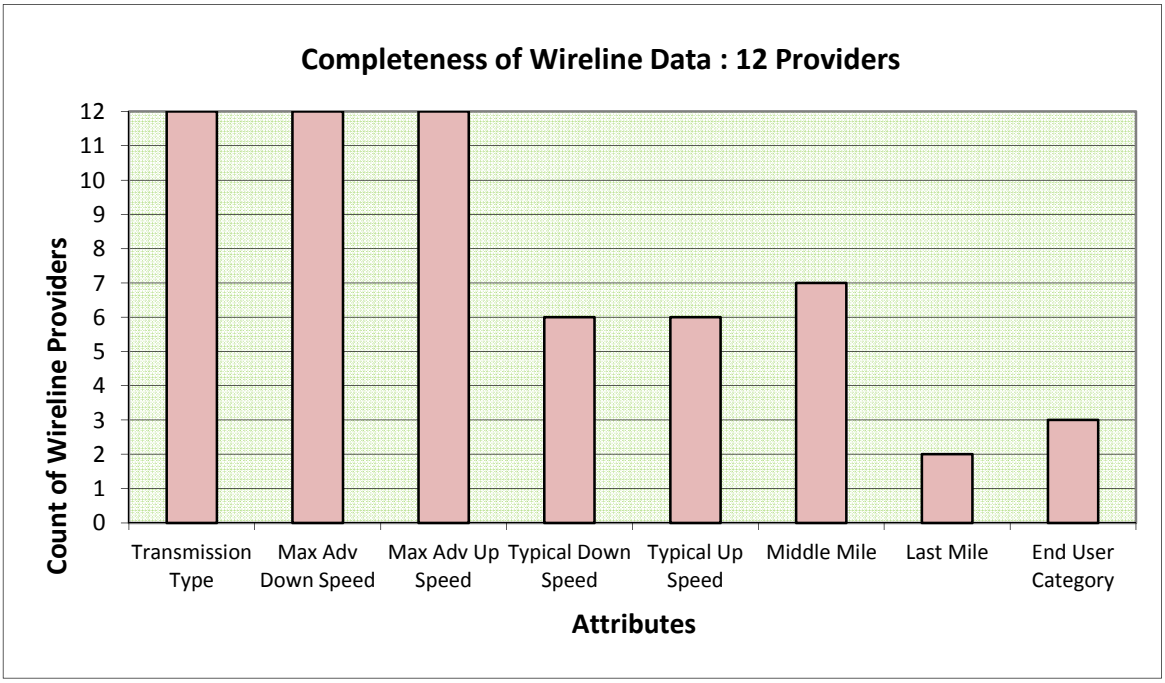
- Rhode Island has extensive broadband coverage from 21 providers. These 21 providers combine to offer broadband coverage for the entire state of Rhode Island.

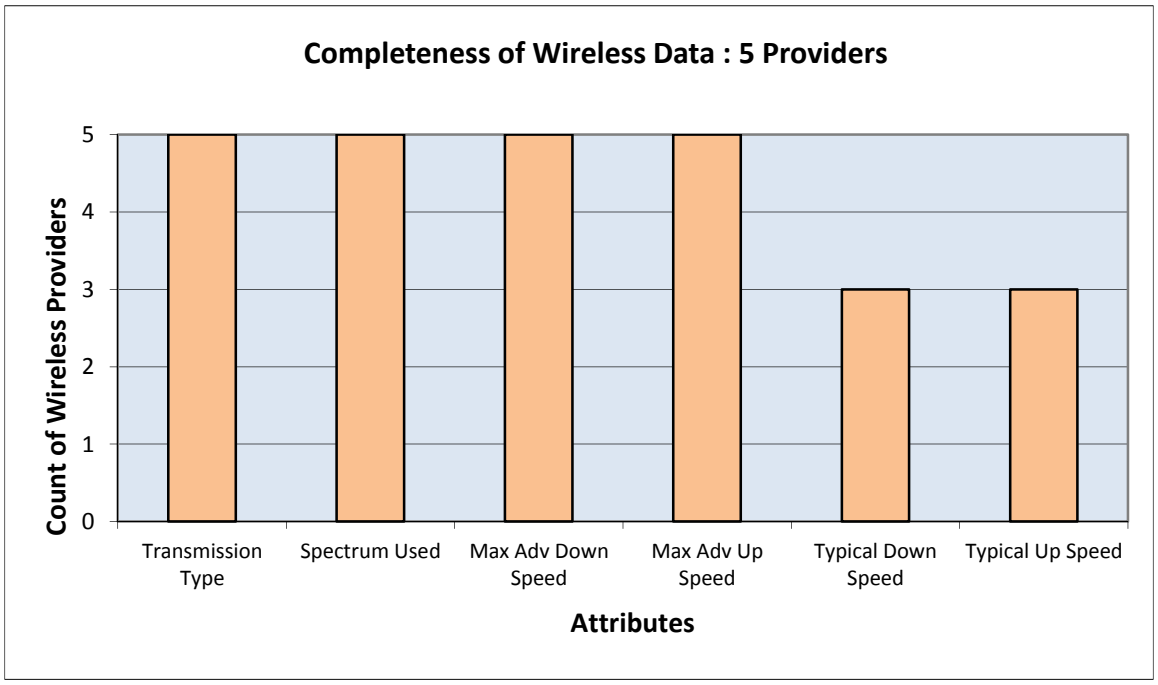
- Broadband availability on a census block basis is summarized in the Figure below:

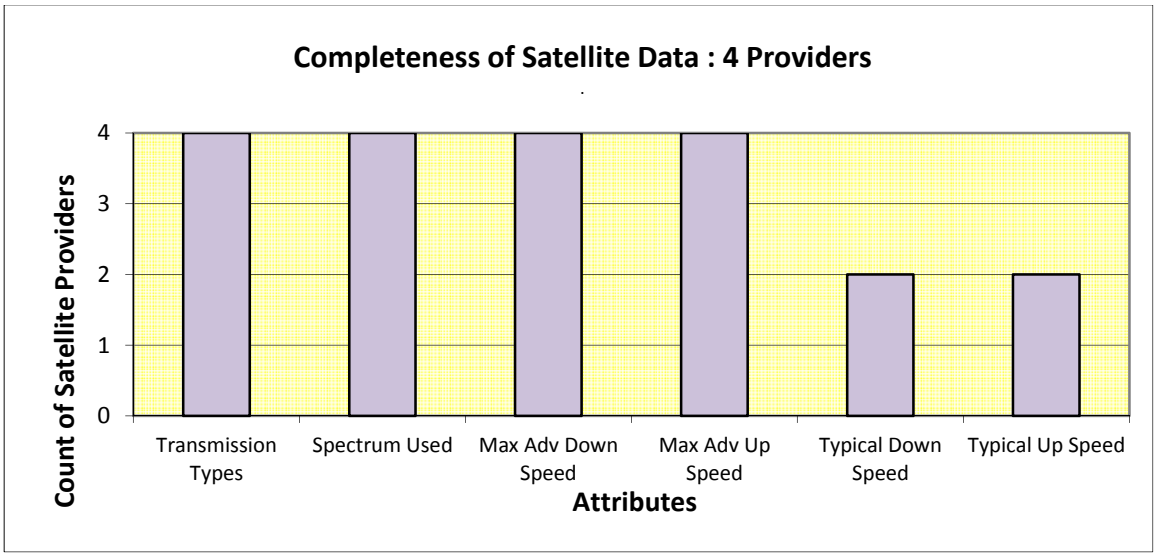
Broadband Availability	Census Blocks	% of Total
Unserved: Census block no access to broadband	0	0
Underserved: One to four broadband providers	82	<1
Competitive: Five to Eight broadband providers	687	3
Nine to Twelve broadband providers	12,725	51
Thirteen to Sixteen broadband providers	11,683	46
Seventeen to Nineteen providers	4	<1
Total	**25,181**	**100**

Note: Broadband is defined as being wireline, wireless and satellite service for this table.

- A total of 21 providers submitted data; 12 wireline, 5 wireless, and 4 satellite. The completeness of the attributes in the 21 providers' datasets is summarized in the Figures below.







- Middle Mile data points were provided by 7 broadband providers. There were a total of 22 facilities (12 owned and 10 leased).
- Middle Mile Backbone data was provided by one provider.
- Last Mile data was provided by 2 broadband providers. Both are owned.
- A total of 1,008 Community Anchor Institutions (CAIs) are identified. These were verified with available Rhode Island Geographic Information System (RIGIS) datasets and RIEDC and FCC speed tests.

- The RIEDC collected 576 speed tests in 179 (<1%) of the census blocks within the State over the past year. These tests are for the period 1/1/2012 to 1/17/2013.

- A total of 2,612 wireline speed tests from FCC were used for the verification. These tests are for the period 3/11/2010 to 1/25/2013 and cover 1,175 (4.7%) of the census blocks within the State. Tests were collected by OOKLA and MLAB.

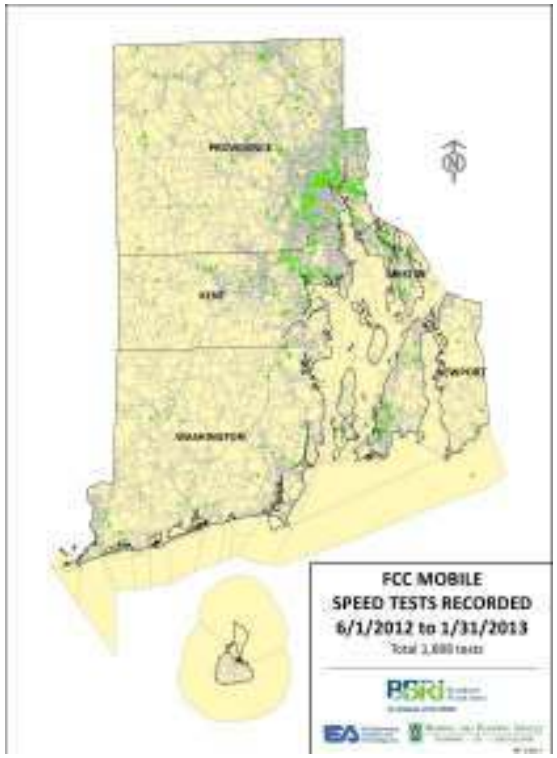
- FCC tests for Mobile Applications (accessing Cellular, WiFi, Edge & UTMS) are also used for the verification. These 1,688 speed tests are recorded for the period 6/1/2012 to 1/31/2013 and cover 355 (1.4%) of the census blocks within the State. These tests were collected by OOKLA.

- A total of 4,876 speed tests (RIEDC, FCC, and FCC Mobile Applications) were used for verification purposes. These were distributed within 1,610 (6.4%) of the 2010 US Census Bureau's 25,181 census blocks in the state. The distribution of each of these sources/types of tests is similar and follows population and household patterns across the State. The distribution of the speed tests are shown in the Figures on the following page.

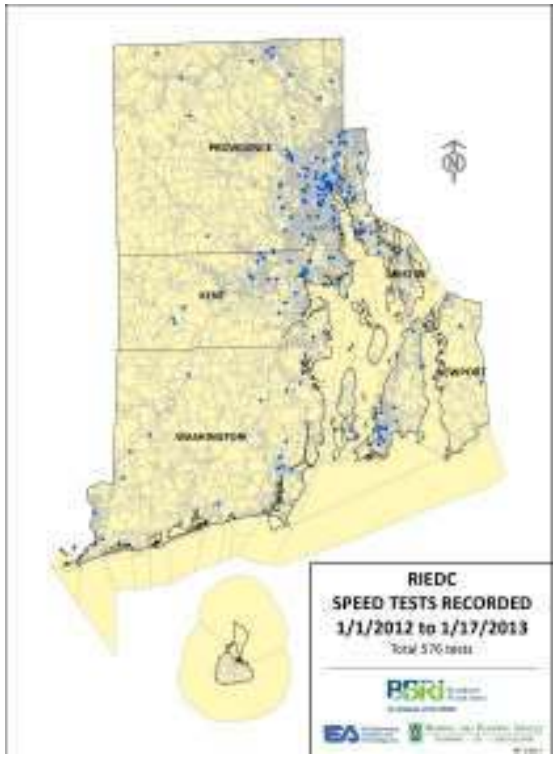
- A total of 56 census blocks are greater than 2 sq. miles, with 28 over land and 28 over open water areas. Road Segment data was provided by 1 provider. Service Address data was provided by 1 provider. All land-based census blocks greater than 2 sq. miles had road segment or service address data.

The Figures below show the distribution of speed tests used for verification purposes.

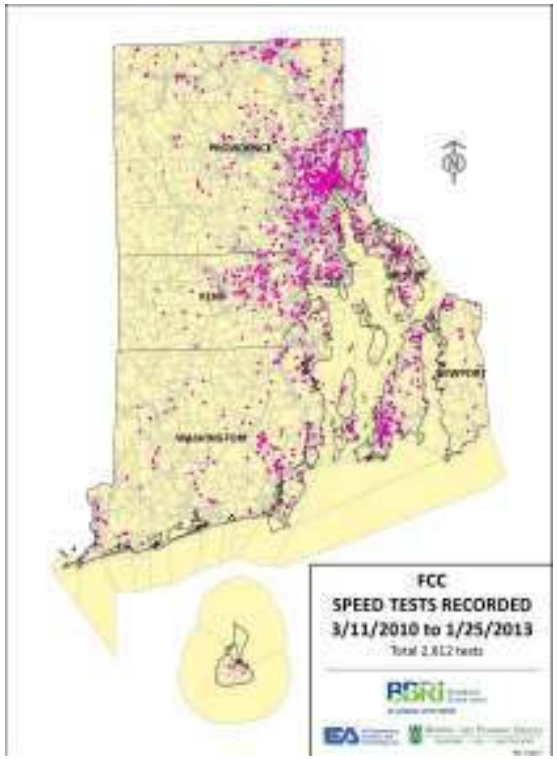
FCC Collected Speed Test - Mobile



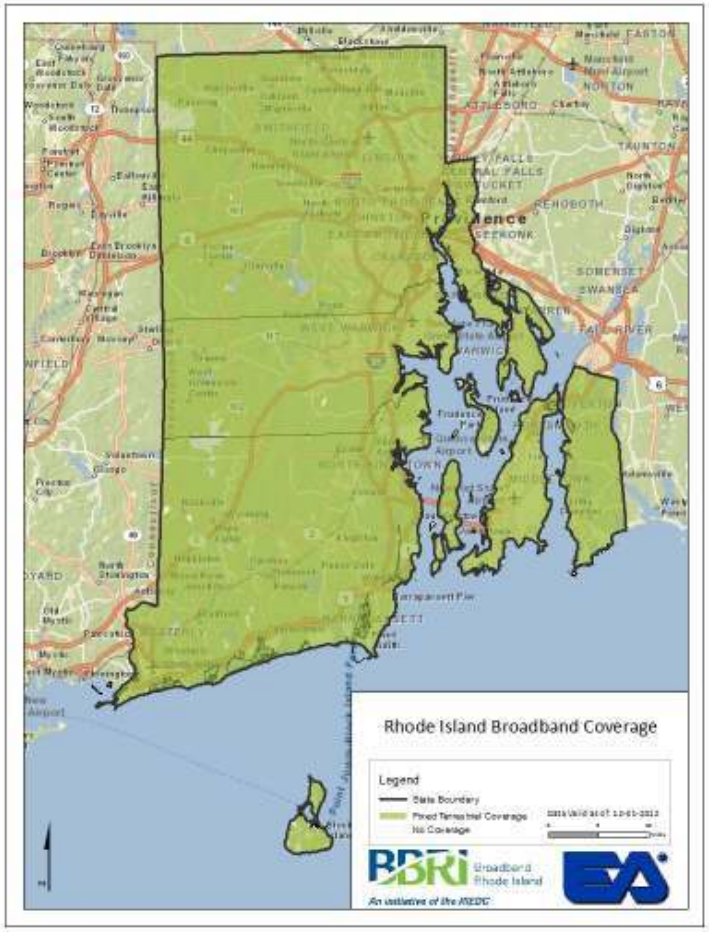
FCC Collected Speed Test - Wireline



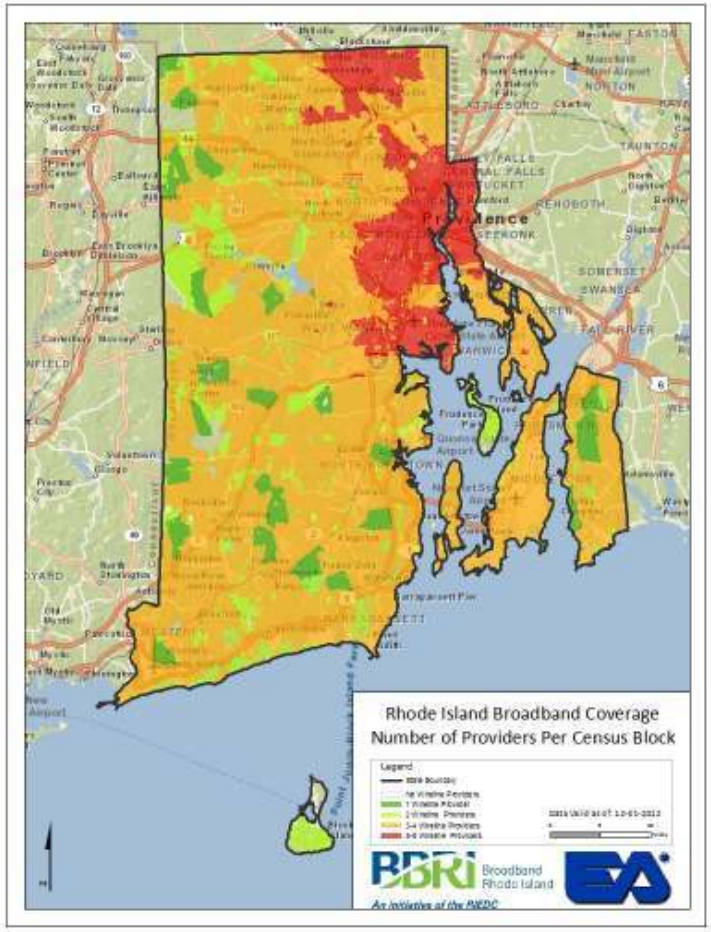
RIEDC Collected Speed Test



The Figures below display the wireline and wireless coverage areas reported in Rhode Island and the number of providers available per census block.



Rhode Island Broadband Coverage Map



Number of Providers Available Per Census Block

The Figures below display the availability of each technology types offered in Rhode Island.

Satellite Coverage

Copper Wireline Coverage

Cable Coverage

The Figures below display the availability of each technology types offered in Rhode Island.

Fiber Optic Coverage

Wireless Coverage

DSL Coverage

Provider Name: Above Net Communications Inc.
DBA: AboveNet

Data Characteristics

FRN:	0000820598
Type of Data Submitted:	Census Blocks
Census Block Count (unique):	2
Provided Technology of Transmission:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	NO
Provided Typical Upload Speed:	NO
Provided Middle Mile:	YES
Provided Last Mile:	YES
Provided End User Category:	YES

Maximum advertised down/upload speeds reported by provider:

Max Download Category	Max Upload Category
11	11

Typical down/upload speeds reported by provider: Not provided

Number of technology transmission types reported by provider: 1

Count and Capacity of Middle Mile Facilities: 1, 6

Count and Capacity of Last Mile Facilities: 1, 11

End user Category: 2

Data Verification:

Counties served by provider and number of census blocks with service. A total of 2 census blocks are served.

County	Census Block per County
Bristol	0
Kent	0
Newport	0
Providence	2
Washington	0

Greatest down/upload speed from RIEDC [1] speed tests: 5, 7
Greatest down/upload speed from FCC [2] speed tests: No speed tests were taken
Greatest down/upload speed from FCC Mobile Application [3] speed tests: No speed tests were taken

Count of RIEDC [1] speed tests: 1
Count of FCC [2] speed tests: 0
Count of FCC Mobile Application [3] speed tests: 0

RIEDC and FCC speed tests outside of reported service area: 0

Middle Mile facilities outside of reported service area: Facility is located within the reported service area.

Last Mile facilities outside of reported service area: Facility is located within the reported service area.

%/# of census blocks verified by RIEDC & FCC speed tests:

Confirmation of census block served	1
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	2
% of served census blocks confirmed by speed test	50%

Footnotes:

1 RIEDC Date Range: 1/1/2012 to 1/17/2013
2 FCC Date Range: 3/11/2010 to 1/25/2013
3 FCC Mobile Application Date Range: 36/1/2012 to 1/31/2013

Provider Name: AT&T Mobility LLC
DBA: AT&T Mobility LLC

Data Characteristics

FRN:	0004979233
Type of Data Submitted:	Wireless
Census Block Count (unique):	N/A
Provided Technology of Transmission:	YES
Provided Spectrum Used:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	NO
Provided Typical Upload Speed:	NO
Provided Middle Mile:	NO
Provided Last Mile:	NO

Maximum advertised down/upload speeds reported by provider:

Max Download Category	Max Upload Category
7	5

Typical down/upload speeds reported by provider: Not provided

Number of technology of transmission types and spectrums reported by provider: 1, with 3 spectrums

Data Verification:

Counties served by provider and number of census blocks with service. A total of 25,026 census blocks are served.

County	Census Blocks per County
Bristol	1,089
Kent	4,182
Newport	2,356
Providence	13,154
Washington	4,245

Greatest down/upload speed from RIEDC [1] speed tests: No speed tests were taken
Greatest down/upload speed from FCC [2] speed tests: No speed tests were taken
Greatest down/upload speed from FCC [3] Mobile Application speed tests: 8, 4

Count of RIEDC speed tests: 0
Count of FCC speed tests: 0
Count of FCC Mobile Application speed tests: 8

Speed tests outside of reported service area: 0

Middle mile facilities outside of reported service area: No middle mile facilities.

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census blocks served	6
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	25,026
% of served census blocks confirmed by speed test	<1%

Middle mile facilities outside of reported service area: No middle mile facilities.

Footnotes:

1 RIEDC Date Range: 1/1/2012 to 1/17/2013
2 FCC Date Range: 3/11/2010 to 1/25/2013
3 FCC Mobile Application Date Range: 36/1/2012 to 1/31/2013

Provider Name: Broadview Networks, Inc.
DBA: Broadview Networks, Inc.

Data Characteristics

FRN:	0003775285
Type of Data Submitted:	Census Blocks
Census Block Count (unique):	9,924
Provided Technology of Transmission:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	NO
Provided Typical Upload Speed:	NO
Provided Middle Mile:	YES
Provided Last Mile:	NO
Provided Road Segments for census blocks greater than 2 sq miles:	NO
Provided Address Points for census block greater than 2 sq miles:	NO
Provided End User Category:	NO

Maximum advertised down/upload speeds reported by provider:

Technology	Max Download Category	Max Upload Category
10	5	5
20	5	5
30	10	10
50	11	11

Typical down/upload speeds reported by provider: No speeds were provided

Number of technology transmission types reported by provider: 4

Count of Middle Mile Facilities: 8

End user Category: Not provided

Data Verification:

Counties served by provider and number of census blocks with service. A total of 9,924 census blocks are served.

County	Census Block per County
Bristol	4
Kent	1,110
Newport	935
Providence	7,868
Washington	7

Greatest down/upload speed from RIEDC [1] speed tests: 3,4
Greatest down/upload speed from FCC [2] speed tests: 4, 4
Greatest down/upload speed from FCC Mobile Application [3] speed tests: No speed tests were taken

Count of RIEDC [1] speed tests: 1
Count of FCC [2] speed tests: 2
Count of FCC Mobile Application [3] speed tests: 0

RIEDC and FCC speed tests outside of reported service area: 0

Middle mile facilities outside of reported service area: All are centrally located within the reported census blocks.

%/# of census blocks verified by RIEDC & FCC speed tests:

Confirmation of census block served	3
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	9,924
% of served census blocks confirmed by speed test	<1%

Footnotes:

1 RIEDC Date Range: 1/1/2012 to 1/17/2013
2 FCC Date Range: 3/11/2010 to 1/25/2013
3 FCC Mobile Application Date Range: 36/1/2012 to 1/31/2013

Provider Name: CellCo Partnership
DBA: Verizon Wireless

Data Characteristics

FRN:	0003290673
Type of Data Submitted:	Wireless
Census Block Count:	N/A
Provided Technology of Transmission:	YES
Provided Spectrum Used:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	YES
Provided Typical Upload Speed:	YES
Provided Middle Mile:	NO
Provided Last Mile:	NO

Maximum advertised down/upload speeds reported by provider:

Max Download Category	Max Upload Category
7	5

Typical down/upload speeds reported by provider: 6, 5

Number of technology of transmission types and spectrums reported by provider: 1, with 4 spectrums

Data Verification:

Counties served by provider and number of census blocks with service. A total of 24,982 census blocks are served.

County	Census Blocks per County
Bristol	1,088
Kent	4,160
Newport	2,346
Providence	13,149
Washington	4,239

Greatest down/upload speed from RIEDC [1] speed tests: No speed tests were taken
Greatest down/upload speed from FCC [2] speed tests: 4, 2
Greatest down/upload speed from FCC Mobile Application [3] speed tests: 7, 4 and 6, 5

Count of RIEDC [1] speed tests: 0
Count of FCC [2] speed tests: 14
Count of FCC Mobile Applications [3] speed tests: 40

RIEDC and FCC speed tests outside of reported service area: 0

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census blocks served	35
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	24,982
% of served census blocks confirmed by speed test	<1%

Footnotes:

1 RIEDC Date Range: 1/1/2012 to 1/17/2013
2 FCC Date Range: 3/11/2010 to 1/25/2013
3 FCC Mobile Application Date Range: 36/1/2012 to 1/31/2013

Provider Name: Clearwire
DBA: Clearwire

Data Characteristics

FRN:	0017775628
Type of Data Submitted:	Wireless
Census Block Count (unique):	N/A
Provided Technology of Transmission:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	NO
Provided Typical Upload Speed:	NO

Maximum down/upload speeds reported by provider:

Max Download Category	Max Upload Category
5	3

Typical down/upload speeds reported by provider: None Provided

Number of technology of transmission types reported by provider: 1, and 1 spectrum

Data Verification:

Counties served by provider and number of census blocks with service. A total of 11,542 census blocks are served.

County	Census Blocks per County
Bristol	62
Kent	2,874
Newport	7
Providence	8,546
Washington	53

Greatest down/upload speed from RIEDC [1] speed tests: 4, 3
Greatest down/upload speed from FCC [2] speed tests: No speed tests were taken
Greatest down/upload speed from FCC Mobile Applications [3] speed tests: 4, 2

Count of RIEDC [1] Speed tests: 4
Count of FCC [2] speed tests: 0
Count of FCC Mobile Applications [3] speed tests: 4

RIEDC and FCC speed tests outside of reported service area: 0

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census block served	4
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	11,542
% of served census blocks confirmed by speed test	<1%

Footnotes:

1 RIEDC Date Range: 1/1/2012 to 1/17/2013
2 FCC Date Range: 3/11/2010 to 1/25/2013
3 FCC Mobile Application Date Range: 36/1/2012 to 1/31/2013

Provider Name: Cogent Communication, Inc.
DBA: Cogent Communication

Data Characteristics

FRN:	0004654042
Type of Data Submitted:	Census Blocks
Census Block Count (unique):	2
Provided Technology of Transmission:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	NO
Provided Typical Upload Speed:	NO
Provided Middle Mile:	YES
Provided Last Mile:	YES
Provided Road Segments for census blocks greater than 2 sq miles:	NO
Provided Address Points for census block greater than 2 sq miles:	NO
Provided End User Category:	YES

Maximum down/upload speeds reported by provider:

Max Download Category	Max Upload Category
11	11

Typical down/upload speeds reported by provider: Not Provided

Number of technology of transmission types reported by provider: 1

Count and Capacity of Middle Mile Facilities: 1, 6

Count and Capacity of Last Mile Facilities: 1, 4

End User Category: 2

Data Verification:

Counties served by provider and number of census blocks with service. A total of 2 census blocks are served.

County	Census Blocks per County
Bristol	0
Kent	0
Newport	0
Providence	2
Washington	0

Greatest down/upload speed from RIEDC [1] speed tests: No speed tests were taken
Greatest down/upload speed from FCC [2] speed tests: No speed tests were taken
Greatest down/upload speed from FCC Mobile Applications [3] speed tests: No speed tests were taken

Count of RIEDC [1] Speed tests: 0
Count of FCC [2] speed tests: 0
Count of FCC Mobile Applications [3] speed tests: 0

RIEDC and FCC speed tests outside of reported service area: No speed tests were taken

Middle mile facilities outside of reported service area: Facility is within the reported census blocks.

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census block served	0
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	2
% of served census blocks confirmed by speed test	0%

Footnotes:

1 RIEDC Date Range: 1/1/2012 to 1/17/2013
2 FCC Date Range: 3/11/2010 to 1/25/2013
3 FCC Mobile Application Date Range: 36/1/2012 to 1/31/2013

Provider Name: CoxCom Inc.
DBA: Cox Communications

Data Characteristics

FRN:	0001524461
Type of Data Submitted:	Census Blocks, Address Points
Census Block Count (unique):	24,344
Service Address Point Count (unique):	1,764
Provided Technology of Transmission:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	NO
Provided Typical Upload Speed:	NO
Provided Middle Mile:	YES
Provided Last Mile:	NO
Provided Road Segments for census blocks greater than 2 sq miles:	NO
Provided Address Points for census block greater than 2 sq miles:	YES
Provided End user Category:	NO

Maximum advertised down/upload speeds reported by provider:

Data Type	Max Download Category	Max Upload Category
Census Blocks	9	5
Service Address Points	9	5

Typical down/upload speeds reported by provider: Not provided

Number of technology of transmission types reported by provider: 1

Count and Capacity of Middle Mile Facilities: 1, 6

End User Category: Not provided

Data Verification:

Counties served by provider and number of census blocks with service. A total of 24,367 census blocks are served (24,344 by census block data and 23 by service address data).

County	Census Blocks per County
Bristol	1,080
Kent	4,115
Newport	2,250
Providence	12,884
Washington	4,038

Greatest down/upload speed from RIEDC [1] speed tests: 7, 6
Greatest down/upload speed from FCC [2] speed tests: 10, 6
Greatest down/upload speed from FCC Mobile Applications [3] speed tests: 7, 7

Count of RIEDC [1] speed tests: 349
Count of FCC [2] speed tests: 1,336
Count of FCC Mobile Applications [3] speed tests: 467

RIEDC and FCC speed tests outside of reported service area: 1 of 2,152 speed tests were recorded outside of the coverage area reported by provider. Located on Jamestown-Verrazzano Bridge/Narragansett Bay area.

Middle mile facilities outside of reported service area: Located within the reported census blocks.

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census block served	856
Census blocks served, not reported by provider	1
Total number of served census blocks reported by provider	24,367
% of served census blocks confirmed by speed test	3.5%

Footnotes:

1 RIEDC Date Range: 1/1/2012 to 1/17/2013
2 FCC Date Range: 3/11/2010 to 1/25/2013
3 FCC Mobile Application Date Range: 36/1/2012 to 1/31/2013

Provider Name: Earthlink
DBA: Earthlink

Data Characteristics

FRN:	0005451166
Type of Data Submitted:	Census Blocks
Census Block Count (unique):	24,462
Provided Technology of Transmission:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	NO
Provided Typical Upload Speed:	NO
Provided Middle Mile:	NO
Provided Last Mile:	NO
Provided Road Segments for census blocks greater than 2 sq miles:	NO
Provided Address Points for census block greater than 2 sq miles:	NO
Provided End User Category:	NO

Maximum advertised down/upload speeds reported by provider:

Technology	Max Download Category	Max Upload Category
10	5	3
40	8	5
50	11	7

Typical down/upload speeds reported by provider: Not provided

Number of technology of transmission types reported by provider: 3

Count of Middle Mile Facilities: Not provided

End User Category: Not provided

Data Verification:

Counties served by provider and number of census blocks with service. A total of 24,462 census blocks are served.

County	Census Blocks per County
Bristol	1,080
Kent	4,112
Newport	2,271
Providence	12,944
Washington	4,055

Greatest down/upload speed from RIEDC [1] speed tests: No speed tests were taken
Greatest down/upload speed from FCC [2] speed tests: No speed tests were taken
Greatest down/upload speed from FCC Mobile Applications [3] speed tests: No speed tests were taken

Count of RIEDC [1] speed tests: 0
Count of FCC [2] speed tests: 0
Count of FCC Mobile Applications [3] speed tests: 0

RIEDC and FCC speed tests outside of reported service area: 0

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census block served	0
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	24,462
% of served census blocks confirmed by speed test	0%

Footnotes:

1 RIEDC Date Range: 1/1/2012 to 1/17/2013
2 FCC Date Range: 3/11/2010 to 1/25/2013
3 FCC Mobile Application Date Range: 36/1/2012 to 1/31/2013

Provider Name: Fiber Technologies Networks, LLC.
DBA: Fibertech

Data Characteristics

FRN:	0006797849
Type of Data Submitted:	Census Blocks
Census Block Count (unique):	16
Provided Technology of Transmission:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	YES, INCOMPLETE (7 of 16)
Provided Typical Upload Speed:	YES, INCOMPLETE (7 of 16)
Provided Middle Mile:	NO
Provided Last Mile:	NO
Provided Road Segments for census blocks greater than 2 sq miles:	NO
Provided Address Points for census block greater than 2 sq miles:	NO
Provided End User Category:	YES

Maximum advertised down/upload speeds reported by provider:

Max Download Category	Max Upload Category
11	11

Typical down/upload speeds reported by provider: 10, 10

Number of technology of transmission types reported by provider: 1

Count of Middle Mile Facilities: 0

End User Category: 2

Data Verification:

Counties served by provider and number of census blocks with service. A total of 16 census blocks are served.

County	Census Blocks per County
Bristol	0
Kent	2
Newport	0
Providence	14
Washington	0

Greatest down/upload speed from RIEDC [1] speed tests: No speed tests were taken
Greatest down/upload speed from FCC [2] speed tests: No speed tests were taken
Greatest down/upload speed from FCC Mobile Applications [3] speed tests: No speed tests were taken

Count of RIEDC [1] speed tests: 0
Count of FCC [2] speed tests: 0
Count of FCC Mobile Applications [3] speed tests: 0

RIEDC and FCC speed tests outside of reported service area: 0

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census block served	0
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	16
% of served census blocks confirmed by speed test	0%

Footnotes:

1 RIEDC Date Range: 1/1/2012 to 1/17/2013
2 FCC Date Range: 3/11/2010 to 1/25/2013
3 FCC Mobile Application Date Range: 36/1/2012 to 1/31/2013

Provider Name: Full Channel TV, Inc.
DBA: Full Channel

Data Characteristics

FRN:	0004973731
Type of Data Submitted:	Census Blocks
Census Block Count (unique):	1,084
Provided Technology of Transmission:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	YES
Provided Typical Upload Speed:	YES
Provided Middle Mile:	YES
Provided Last Mile:	NO
Provided Road Segments for census blocks greater than 2 sq miles:	NO
Provided Address Points for census block greater than 2 sq miles:	NO
Provided End User Category:	NO

Maximum advertised down/upload speeds reported by provider:

Max Download Category	Max Upload Category
6	4

Typical down/upload speeds reported by provider: 6, 4

Number of technology of transmission types reported by provider: 1

Count and Capacity of Middle Mile Facilities: 1, 3

End User Category: Not provided

Data Verification:

Counties served by provider and number of census blocks with service. A total of 1,084 census blocks are served.

County	Census Blocks per County
Bristol	1,084
Kent	0
Newport	0
Providence	0
Washington	0

Greatest down/upload speed from RIEDC [1] speed tests: 6, 4
Greatest down/upload speed from FCC [2] speed tests: 7, 5
Greatest down/upload speed from FCC [3] Mobile Applications speed tests: 6, 6

Count of RIEDC [1] speed tests: 1
Count of FCC [2] speed tests: 15
Count of FCC Mobile Applications [3] speed tests: 25

RIEDC and FCC speed tests outside of reported service area: 1 mobile speed test was within 4.5 miles of the serviced area.

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census block served	15
Census blocks served, not reported by provider	1
Total number of served census blocks reported by provider	1,084
% of served census blocks confirmed by speed test	<1%

Footnotes:

1 RIEDC Date Range: 1/1/2012 to 1/17/2013
2 FCC Date Range: 3/11/2010 to 1/25/2013
3 FCC Mobile Application Date Range: 36/1/2012 to 1/31/2013

Provider Name: Hughes Network Systems, LLC
DBA: Hughes

Data Characteristics

FRN:	0009559881
Type of Data Submitted:	Satellite
Census Block Count (unique):	N/A
Provided Technology of Transmission:	YES
Provided Spectrum Used:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	YES
Provided Typical Upload Speed:	YES

Maximum advertised down/upload speeds reported by provider:

Max Download Category	Max Upload Category
5	2

Typical down/upload speeds reported by provider: 5, 1

Number of technology of transmission types reported by provider: 1, with 1 spectrum

Data Verification:

Counties served by provider and number of census blocks with service. A total of 25,181 census blocks are served.

County	Census Blocks per County
Bristol	1,092
Kent	4,183
Newport	2,452
Providence	13,157
Washington	4,297

Greatest down/upload speed from RIEDC [1] speed tests: No speed tests were taken
Greatest down/upload speed from FCC [2] speed tests: No speed tests were taken
Greatest down/upload speed from FCC Mobile Application [3] speed tests: No speed tests were taken

Count of RIEDC [1] speed tests: 0
Count of FCC [2] speed tests: 0
Count of FCC Mobile Applications [3] speed tests: 0

RIEDC and FCC speed tests outside of reported service area: 0

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census block served	0
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	25,181
% of served census blocks confirmed by speed test	0%

Footnotes:

1 RIEDC Date Range: 1/1/2012 to 1/17/2013
2 FCC Date Range: 3/11/2010 to 1/25/2013
3 FCC Mobile Application Date Range: 36/1/2012 to 1/31/2013

Provider Name: Level 3 Communications, LLC
DBA: Broadwing

Data Characteristics

FRN:	0003723822
Type of Data Submitted:	Census Blocks
Census Block Count (unique):	19
Provided Technology of Transmission:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	YES
Provided Typical Upload Speed:	YES
Provided Typical Download Speed:	YES
Provided Middle Mile:	YES
Provided Last Mile:	NO
Provided Road Segments for census blocks greater than 2 sq miles:	NO
Provided Address Points for census block greater than 2 sq miles:	NO
Provided End User Category:	NO

Maximum advertised down/upload speeds reported by provider:

Max Download Category	Max Upload Category
11	11

Typical down/upload speeds reported by provider: 11, 11

Number of technology of transmission types reported by provider: 1

Count and Capacity of Middle Mile Facilities: 7, 6

End User Category: Not provided

Data Verification:

Counties served by provider and number of census blocks with service. A total of 19 census blocks are served.

County	Census Blocks per County
Bristol	0
Kent	0
Newport	0
Providence	19
Washington	0

Greatest down/upload speed from RIEDC [1] speed tests: 4, 4
Greatest down/upload speed from FCC [2] speed tests: 7, 5
Greatest down/upload speed from FCC Mobile Applications [3] speed tests: No speed tests were taken

Count of RIEDC [1] speed tests: 1
Count of FCC [2] speed tests: 1
Count of FCC Mobile Applications [3] speed tests: 0

RIEDC and FCC speed tests outside of reported service area: 2 of 2 speed tests were recorded outside the coverage area reported by provider (within the Town of North Kingstown).

Middle mile facilities outside of reported service area: None of the 8 facilities reported are located within the reported service area.

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census blocks served	0
Census blocks served, not reported by provider	2
Total number of served census blocks reported by provider	19
% of served census blocks confirmed by speed test	0%

Footnotes:

1 RIEDC Date Range: 1/1/2012 to 1/17/2013
2 FCC Date Range: 3/11/2010 to 1/25/2013
3 FCC Mobile Application Date Range: 36/1/2012 to 1/31/2013

Provider Name: Lightower Fiber Networks
DBA: Lightower Fiber Networks

Data Characteristics

FRN:	00017625567
Type of Data Submitted:	Census Blocks
Census Block Count (unique):	8,950
Provided Technology of Transmission:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	YES
Provided Typical Upload Speed:	YES
Provided Middle Mile:	NO
Provided Last Mile:	NO
Provided Road Segments for census blocks greater than 2 sq miles:	NO
Provided Address Points for census block greater than 2 sq miles:	NO
Provided End User Category:	NO

Maximum advertised down/upload speeds reported by provider:

Max Download Category	Max Upload Category
11	11

Typical down/upload speeds reported by provider: 11, 11

Number of technology of transmission types reported by provider: 1

Count and Capacity of Middle Mile Facilities: 0, 0

End User Category: Not provided

Data Verification:

Counties served by provider and number of census blocks with service. A total of 8,950 census blocks are served.

County	Census Blocks per County
Bristol	0
Kent	403
Newport	0
Providence	8,547
Washington	0

Greatest down/upload speed from RIEDC [1] speed tests: No speed tests were taken
Greatest down/upload speed from FCC [2] speed tests: No speed tests were taken
Greatest down/upload speed from FCC Mobile Applications [3] speed tests: No speed tests were taken

Count of RIEDC [1] speed tests: 0
Count of FCC [2] speed tests: 0
Count of FCC Mobile Application [3] speed tests: 0

RIEDC and FCC speed tests outside of reported service area: No speed tests were taken

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census block served	0
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	8,950
% of served census blocks confirmed by speed test	0%

Footnotes:

1 RIEDC Date Range: 1/1/2012 to 1/17/2013
2 FCC Date Range: 3/11/2010 to 1/25/2013
3 FCC Mobile Application Date Range: 36/1/2012 to 1/31/2013

Provider Name: MegaPath Corporation
DBA: MegaPath Corporation

Data Characteristics

FRN:	0003753753
Type of Data Submitted:	Census Blocks
Census Block Count (unique):	12,253
Provided Technology of Transmission:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	YES
Provided Typical Upload Speed:	YES
Provided Middle Mile:	NO
Provided Last Mile:	NO
Provided Road Segments for census blocks greater than 2 sq miles:	NO
Provided Address Points for census block greater than 2 sq miles:	NO
Provided End User Category:	NO

Maximum advertised down/upload speeds reported by provider:

Technology	Max Download Category	Max Upload Category
10	6	3
20	8	8
30	5	5

Typical down/upload speeds reported by provider:

Technology	Typical Download Category	Typical Upload Category
10	5	2
20	8	8
30	5	5

Number of technology of transmission types reported by provider: 3

Count and Capacity of Middle Mile Facilities: 0, 0

End User Category: Not provided

Data Verification:

Counties served by provider and number of census blocks with service. A total of 12,253 census blocks are served.

County	Census Blocks per County
Bristol	3
Kent	2,924
Newport	0
Providence	9,326
Washington	0

Greatest down/upload speed from RIEDC [1] speed tests: No speed tests were taken
Greatest down/upload speed from FCC [2] speed tests: No speed tests were taken
Greatest down/upload speed from FCC Mobile Applications [3] speed tests: No speed tests were taken

Count of RIEDC [1] speed tests: 0
Count of FCC [2] speed tests: 0
Count of FCC Mobile Application [3] speed tests: 0

RIEDC and FCC speed tests outside of reported service area: No speed tests were taken.

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census block served	0
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	12,253
% of served census blocks confirmed by speed test	0%

Footnotes:

1 RIEDC Date Range: 1/1/2012 to 1/17/2013
2 FCC Date Range: 3/11/2010 to 1/25/2013
3 FCC Mobile Application Date Range: 36/1/2012 to 1/31/2013

Provider Name: OSHEAN
DBA: OSHEAN

Data Characteristics

FRN:	N/A
Type of Data Submitted:	Census Blocks
Census Block Count (unique):	86
Provided Technology of Transmission:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	YES
Provided Typical Upload Speed:	YES
Provided Middle Mile Backbone:	YES
Provided Last Mile:	NO
Provided Road Segments for census blocks greater than 2 sq miles:	NO
Provided Address Points for census block greater than 2 sq miles:	YES
Provided End User Category:	YES

Maximum advertised down/upload speeds reported by provider:

Max Download Category	Max Upload Category
11	11

Typical down/upload speeds reported by provider: 11, 11

Number of technology of transmission types reported by provider: 1

End User Category: 2

Data Verification:

Counties served by provider and number of census blocks with service. A total of 23,684 census blocks are served.

County	Census Blocks per County
Bristol	3
Kent	17
Newport	8
Providence	55
Washington	3

Greatest down/upload speed from RIEDC [1] speed tests: 7, 7
Greatest down/upload speed from FCC [2] speed tests: 8, 5
Greatest down/upload speed from FCC Mobile Applications [3] speed tests: 5, 5

Count of RIEDC [1] speed tests: 3
Count of FCC [2] speed tests: 5
Count of FCC Mobile Application [3] speed tests: 3

RIEDC and FCC speed tests outside of reported service area: 0

Middle Mile Backbone facilities outside of reported service area: 0

%/# of census blocks verified by Middle Mile Backbone data:

Confirmation of census block served	64
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	86
% of served census blocks confirmed by backbone data	74%

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census block served	8
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	86
% of served census blocks confirmed by speed test	<1%

Footnotes:

1 RIEDC Date Range: 1/1/2012 to 1/17/2013
2 FCC Date Range: 3/11/2010 to 1/25/2013
3 FCC Mobile Application Date Range: 36/1/2012 to 1/31/2013

Provider Name: Skycasters
DBA: Skycasters

Data Characteristics

FRN:	0018756155
Type of Data Submitted:	Satellite
Census Block Count (unique):	N/A
Provided Technology of Transmission:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	YES
Provided Typical Upload Speed:	YES

Maximum advertised down/upload speeds reported by provider:

Max Download Category	Max Upload Category
6	4

Typical down/upload speeds reported by provider: 5, 2

Number of technology of transmission types reported by provider: 1, and 1 spectrum

Data Verification:

Counties served by provider and number of census blocks with service. A total of 25,181 census blocks are served.

County	Census Blocks per County
Bristol	1,092
Kent	4,183
Newport	2,452
Providence	13,157
Washington	4,297

Greatest down/upload speed from RIEDC [1] speed tests: No speed tests were taken
Greatest down/upload speed from FCC [2] speed tests: No speed tests were taken
Greatest down/upload speed from FCC Mobile Applications [3] speed tests: No speed tests were taken

Count of RIEDC [1] speed tests: 0
Count of FCC [2] speed tests: 0
Count of FCC Mobile Application [3] speed tests: 0

RIEDC and FCC speed tests outside of reported service area: No speed tests were taken

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census block served	0
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	25,181
% of served census blocks confirmed by speed test	0%

Footnotes:

1 RIEDC Date Range: 1/1/2012 to 1/17/2013
2 FCC Date Range: 3/11/2010 to 1/25/2013
3 FCC Mobile Application Date Range: 36/1/2012 to 1/31/2013

Provider Name: Sprint Nextel Corporation
DBA: Sprint

Data Characteristics

FRN:	0003774593
Type of Data Submitted:	Wireless
Census Block Count (unique):	N/A
Provided Technology of Transmission:	YES
Provided Spectrum Used:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	YES
Provided Typical Upload Speed:	YES
Provided Middle Mile:	NO
Provided Last Mile:	NO

Maximum advertised down/upload speeds reported by provider:

Max Download Category	Max Upload Category
6	4

Typical down/upload speeds reported by provider: 6, 4

Number of technology of transmission types reported by provider: 1, with 2 spectrums

Data Verification:

Counties served by provider and number of census blocks with service. A total of 24,101 census blocks are served.

County	Census Blocks per County
Bristol	1,087
Kent	3,962
Newport	2,199
Providence	12,809
Washington	4,044

Greatest down/upload speed from RIEDC [1] speed tests: 3, 3
Greatest down/upload speed from FCC [2] speed tests: 7, 6
Greatest down/upload speed from FCC Mobile Applications [3] speed tests: 7, 6

Count of RIEDC [1] speed tests: 1
Count of FCC [2] speed tests: 5
Count of FCC Mobile Applications [3] speed tests: 500

RIEDC and FCC speed tests outside of reported service area: 0

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census blocks served	78
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	24,101
% of served census blocks confirmed by speed test	<1%

Footnotes:

1 RIEDC Date Range: 1/1/2012 to 1/17/2013
2 FCC Date Range: 3/11/2010 to 1/25/2013
3 FCC Mobile Application Date Range: 36/1/2012 to 1/31/2013

Provider Name: StarBand Communications, Inc.
DBA: StarBand Communications, Inc.

Data Characteristics

FRN:	0005087457
Type of Data Submitted:	Satellite
Census Block Count:	N/A
Provided Technology of Transmission:	YES
Provided Spectrum Used:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	NO
Provided Typical Upload Speed:	NO

Maximum advertised down/upload speeds reported by provider:

Max Download Category	Max Upload Category
3	2

Typical down/upload speeds reported by provider: Not reported

Number of technology of transmission types reported by provider: 1, with 1 spectrum

Data Verification:

Counties served by provider and number of census blocks with service. A total of 25,181 census blocks are served:

County	Census Block per County
Bristol	1,092
Kent	4,183
Newport	2,452
Providence	13,157
Washington	4,297

Greatest down/upload speed from RIEDC [1] speed test: No speed tests were taken
Greatest down/upload speed from FCC [2] speed test: No speed tests were taken
Greatest down/upload speed from FCC Mobile Applications [3] speed test: No speed tests were taken

Count of RIEDC [1] speed tests: 0
Count of FCC [2] speed tests: 0
Count of FCC Mobile Applications [3] speed test: 0

RIEDC and FCC speed tests outside of reported service area: 0

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census block served	0
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	25,181
% of served census blocks confirmed by speed test	0%

Footnotes:

1 RIEDC Date Range: 1/1/2012 to 1/17/2013
2 FCC Date Range: 3/11/2010 to 1/25/2013
3 FCC Mobile Application Date Range: 36/1/2012 to 1/31/2013

Provider Name: T-Mobile USA, Inc.
DBA: T-Mobile

Data Characteristics

FRN:	0006945950
Type of Data Submitted:	Wireless
Census Block Count (unique):	N/A
Provided Technology of Transmission:	YES
Provided Spectrum Used:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	YES
Provided Typical Upload Speed:	YES
Provided Middle Mile:	YES
Provided Last Mile:	NO

Maximum advertised down/upload speeds reported by provider:

Technology	Max Download Category	Max Upload Category
80	7	4

Typical down/upload speeds reported by provider: 6, 3

Number of technology of transmission types reported by provider: 1, with 1 spectrum

Count and Capacity of Middle Mile facilities: 3, 6

Data Verification:

Counties served by provider and number of census blocks with service. A total of 24,034 census blocks are served.

County	Census Blocks per County
Bristol	1,088
Kent	3,916
Newport	2,305
Providence	12,720
Washington	4,005

Greatest down/upload speed from RIEDC [1] speed tests: No speed tests were taken
Greatest down/upload speed from FCC [2] speed tests: 3, 2
Greatest down/upload speed from FCC Mobile Applications [3] speed tests: 7, 4

Count of RIEDC 2010 [2] speed tests: 0
Count of FCC 2010 [3] speed tests: 1
Count of FCC 2010 Mobile Applications [4] speed tests: 52

RIEDC and FCC speed tests outside of reported service area: 0

Middle mile facilities outside of reported service area: The three facilities are within the reported service area.

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census blocks served	7
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	24,034
% of served census blocks confirmed by speed test	<1%

Footnotes:

1 RIEDC Date Range: 1/1/2012 to 1/17/2013
2 FCC Date Range: 3/11/2010 to 1/25/2013
3 FCC Mobile Application Date Range: 36/1/2012 to 1/31/2013

Provider Name: Verizon New England Inc.
DBA: Verizon

Data Characteristics

FRN:	0003628971
Type of Data Submitted:	Census Blocks, Road Segments
Census Block Count (unique):	18,532
Road Segment Count (unique):	733
Provided Technology of Transmission:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	NO
Provided Typical Upload Speed:	NO
Provided Middle Mile:	NO
Provided Last Mile:	NO
Provided Road Segments for census blocks greater than 2 sq miles:	YES
Provided Address Points for census blocks greater than 2 sq miles:	NO
Provided End User Category:	NO

Maximum advertised down/upload speeds reported by provider:

Technology	Max Download Category	Max Upload Category
10	6	3
50	9	7

Typical down/upload speeds reported by provider: Not provided

Number of technology of transmission types reported by provider: 2

Total count of Middle Mile facilities: Not provided

End user Category: Not provided

Data Verification:

Counties served by provider and number of census blocks with service. A total of 18,560 census blocks are served (18,532 by census block data and 28 by road segment service data).

County	Census Blocks per County
Bristol	894
Kent	3,241
Newport	1,640
Providence	10,231
Washington	2,554

Greatest down/upload speed from RIEDC 2010 [1] speed tests: 6, 7
Greatest down/upload speed from FCC 2010 [2] speed tests: 10, 7 and 9, 8
Greatest down/upload speed from FCC 2010 [3] Mobile Application speed tests: 8, 8

Count of RIEDC [1] speed tests: 164
Count of FCC [2] speed tests: 639
Count of FCC Mobile Application [4] speed tests: 351

RIEDC and FCC speed tests outside of reported service area: 0

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census block served	435
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	18,560
% of served census blocks confirmed by speed test	2.3%

Footnotes:

1 RIEDC Date Range: 1/1/2012 to 1/17/2013
2 FCC Date Range: 3/11/2010 to 1/25/2013
3 FCC Mobile Application Date Range: 36/1/2012 to 1/31/2013

Provider Name: ViaSat
DBA: ViaSat

Data Characteristics

FRN:	0017588898
Type of Data Submitted:	Satellite
Census Block Count (unique):	N/A
Provided Technology of Transmission:	YES
Provided Spectrum Used:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	NO
Provided Typical Upload Speed:	NO

Maximum advertised down/upload speeds reported by provider:

Max Download Category	Max Upload Category
7	7

Typical down/upload speeds reported by provider: Not provided

Number of technology of transmission types reported by provider: 1, and 1 spectrum

Data Verification:

Counties served by provider and number of census blocks with service. A total of 24,432 census blocks are served.

County	Census Blocks per County
Bristol	1,001
Kent	3,834
Newport	2,379
Providence	12,970
Washington	4,248

Greatest down/upload speed from RIEDC [1] speed tests: No speed tests were taken
Greatest down/upload speed from FCC [2] speed tests: No speed tests were taken
Greatest down/upload speed from FCC Mobile Application [3] speed tests: No speed tests were taken

Count of RIEDC [1] speed tests: 0
Count of FCC [2] speed tests: 0
Count of FCC Mobile Application [3] speed tests: 0

RIEDC and FCC speed tests outside of reported service area: 0

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census block served	0
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	24,432
% of served census blocks confirmed by speed test	0%

Footnotes:

1 RIEDC Date Range: 1/1/2012 to 1/17/2013
2 FCC Date Range: 3/11/2010 to 1/25/2013
3 FCC Mobile Application Date Range: 36/1/2012 to 1/31/2013

Community Anchor Institutions: All categories

Data Characteristics

Type of Data Submitted:	Point
Feature Count:	1,008
Provided Technology of Transmission:	YES, INCOMPLETE (332 of 1,008)
Provided Subscribe Downstream Speed:	YES, INCOMPLETE (394 of 1,008)
Provided Subscribe Upstream Speed:	YES, INCOMPLETE (835 of 1,008)
Provided Street Address:	YES, COMPLETE
Provide Public Wifi:	YES, INCOMPLETE (788 of 1,008)
Provided URL:	YES, INCOMPLETE (648 of 1,008)
Provided CAIID:	YES, INCOMPLETE (610 of 1,008)

Count of Community Anchor Institutions by category:

CAI Category	Count of Features
1 – School K through Grade 12	513
2 - Library	91
3 – Medical/healthcare	57
4 – Public safety	242
5 – Univ., college, other post-secondary	27
6 – Other govt support - govt	72
7 – Other govt support - non-govt	6

Maximum Subscribe down/upstream speeds reported by institutions:

CAI Category	Max Downstream Category	Max Upstream Category	Count
1	10	10	1
2	10	10	1
3	11	11	3
4	10	10	3
5	11	11	2
6	11	11	1
7	7	6	1

Number of technology of transmission types reported by provider: 9

Data Verification:

Greatest down/upload speed from RIEDC [1] speed test: 8, 7 and 7, 8
Greatest down/upload speed from FCC [2] speed test: 9, 6 and 8, 8
Greatest down/upload speed from FCC Mobile Applications [3] speed tests: 3, 2

Count of RIEDC speed tests: 31
Count of FCC speed tests: 70
Count of FCC Mobile Applications speed tests: 2

Footnotes:

1 RIEDC Date Range: 1/1/2012 to 1/17/2013
2 FCC Date Range: 3/11/2010 to 1/25/2013
3 FCC Mobile Application Date Range: 36/1/2012 to 1/31/2013

Section C: Data Processes and Submission Overview

Submission Summary

The Broadband Rhode Island Mapping (BBRI) Team, led by EA Engineering, Science & Technology, Inc. (EA), in its role as primary technical lead for the BBRI project, contacted 21 potential facilities-based broadband service providers (BSPs) and received data from all 21 providers for this round of data collection. An overall summary of the data submission is described below:

Of those that provided data:

- 9 provided only census block information
- 2 provided census blocks and addresses
- 1 provided census blocks and road segments
- 9 provided wireless coverage areas

In addition, 7 of the 21 responsive BSPs provided middle mile infrastructure points, 1 responsive BSP provided middle mile backbone information, and 2 of 18 responsive BSPs provided last mile infrastructure points.

Besides the 21 providers contacted during the current round of broadband data collection, the BBRI team has previously reached out to an additional 122 potential broadband providers. These 122 broadband providers did not provide data because they were either broadband resellers, their data was being collected under a different provider's dataset, they were non-responsive, they chose not to participate, or they did not offer service in Rhode Island. The 122 providers previously researched and contacted are listed below:

1. 360 networks (USA) Inc.
2. A.R.C. Networks, Inc. / ATX Licensing, Inc. /
3. Access Point, Inc.
4. ACN Communication Services, Inc.
5. Ad-Base Systems Inc. (DBA GlobalPOPS)
6. Airespring, Inc.
7. AmeriVision Communications d/b/a Affinity 4
8. Apogee Telecom
9. ATC Outdoor DAS, LLC
10. Bandwidth.com CLEC, LLC
11. BBN Communications
12. BCN Telecom, Inc.
13. Bell South Long Distance, Inc.
14. Bellsouth.Net
15. BLC Management, LLC d/b/a Angles Communications Solutions
16. Broadview Networks, Inc.

17. Broadvox-CLEC, LLC
18. Budget PrePay, Inc. d/b/a Budget Phone
19. BullsEye Telecom, Inc.
20. CCG Communications, LLC d/b/a Veroxity Technical Partners, Inc.
21. CERFnet
22. Charter Communications
23. Cleartel Telecommunications, Inc. (acquired by Birch)
24. CloseCall America, Inc.
25. Comcast Business Communications
26. Comcast Cable
27. CommPartners, LLC
28. Commrail (Access Northeast)
29. Computer Sciences Corporation
30. ComTech21, LLC
31. Comtel Telcom Assets LP d/b/a Clear Choice Communication
32. Conversent Communications (d/b/a Earthlink Business III)
33. Covista, Inc.
34. Cricket Communications
35. CTC Communications (d/b/a One Communications)
36. DSCI Corporation
37. DSL.net
38. EasyNet
39. Entelegent Solutions, Inc.
40. Ernest Communications, Inc.
41. Evercom Systems, Inc.
42. ExteNet Systems, Inc.
43. FAIRPOINT COMMUNICATIONS
44. Global Capacity Group, Inc.
45. Global Crossing Telecommunications, Inc.
46. Global NAPS, Inc.
47. Granite Telecommunications, LLC
48. Hickory Tech. Corp. / Enventis Telecom, Inc.
49. Hosttech Communications, LLC
50. IDT America, Corp.
51. inContact, Inc. (f/k/a UCN, Inc.)
52. Intap, LLC (dba Big Dog Technologies, Inc.)
53. Internap Network Services
54. International Telecom, Ltd.
55. Internet & Telephone, LLC
56. Intrado Communications, Inc.
57. ISP Alliance (ZCorum)
58. Key3Media Events (Media Live International)
59. LexMark International

60. Lightyear Network Solutions, LLC
61. Link Technologies
62. Macross Information Systems
63. Magellan Hill Technologies, LLC
64. Masergy Communications
65. Matrix Telecom, Inc.
66. Meganet Communications
67. Melita PLC (fka Melita Cable Cable plc)
68. MetroCast Cablevision
69. Metropolitan Telecommunications of Rhode Island
70. Mitel NetSolutions, Inc.
71. Mobile Beacon
72. Mobilitie Investments, LLC
73. MTS Allstream
74. Mzima Networks
75. NationalNet
76. Navigator Telecommunications, LLC
77. "NEON Connect, Inc. / RCN New York Communications, LLC
78. Neutral Tandem – Rhode Island, LLC
79. New Edge Networks
80. New Horizons Communications Corp.
81. Nextel Communications
82. NextG Networks of NY
83. Nextira One, LLC d/b/a Black Box Network Services
84. Nextlink Wireless, Inc.
85. nFrame
86. Nortel Networks
87. North Atlantic Networks, LLC
88. Norwood Light Broadband
89. Pac-West Telecomm, Inc.
90. PAETEC
91. Pipeline Wireless LLC
92. Primus Telecommunications, Inc.
93. ProvDotNet LLC
94. Qwest Communications Company, LLC / Qwest Communications of Delaware
95. RCN Corporation
96. REON Broadband Corporation
97. RNK, Inc.
98. SAVVIS Communications Corporation
99. SBA Communications Corp. (acquired National Grid Communications)
100. SBC Internet Services
101. Secured Network Services
102. Serbia Broadband-Srpske Kablovske mreze dcc

103. SpeakEasy
104. Spectrotel, Inc.
105. STSN GENERAL HOLDINGS
106. TDS TELECOM
107. Telrite Corporation
108. Thames Valley Communications
109. The Internet Connection
110. Total Communications Inc.
111. Towerstream Inc.
112. Trans National Communications International
113. United Systems Access Telecom, Inc. d/b/a/ USA Telephone
114. Virgin Media
115. Wayport
116. Wholesale Carrier Services, Inc.
117. WilTel Communications Group, LLC
118. Wireless Data Service Provider
119. XO Communications Services, Inc.
120. Ymax Communications Corp.
121. Zone Four
122. Zone Telecom, Inc.

Rhode Island Broadband Mapping Data Processes

Data Received From Providers – The process begins by receiving data from each provider that offers service in the State of Rhode Island (RI). Broadband data is currently received from 21 broadband facility based service providers within the State who have signed Non-Disclosure Agreements with RIEDC. Once all of the available data is received from a provider it is reviewed and archived in its native format. While the same data is requested from each provider the information often comes in different formats and with missing attribute and or spatial data. If attributes are missing from the dataset the provider is contacted to see if the missing information is available.

Data Evaluated & Processed – The EA project team gives the data spatial attributes through geocoding to the RI E911 data or by joining the data to the 2010 census block data. The attribute data is then formatted so that the database can easily be entered in the Broadband Rhode Island geodatabase. Speeds reported below broadband levels are removed from the dataset and archived. Data that is located in census blocks great than 2 square miles are loaded into either the address or street segment feature classes. All remaining data is loaded into the census block feature class. The data is loaded using Esri tools and software. The Broadband Rhode Island, or our data analysis geodatabase, stores the most recent broadband information. Data is extracted from this geodatabase and formatted as needed to be used for the State's web map and our biannual NTIA submittals. Data is pulled from this analysis database, formatted to meet the web and NTIA formatting requirements, and loaded into either the NTIA

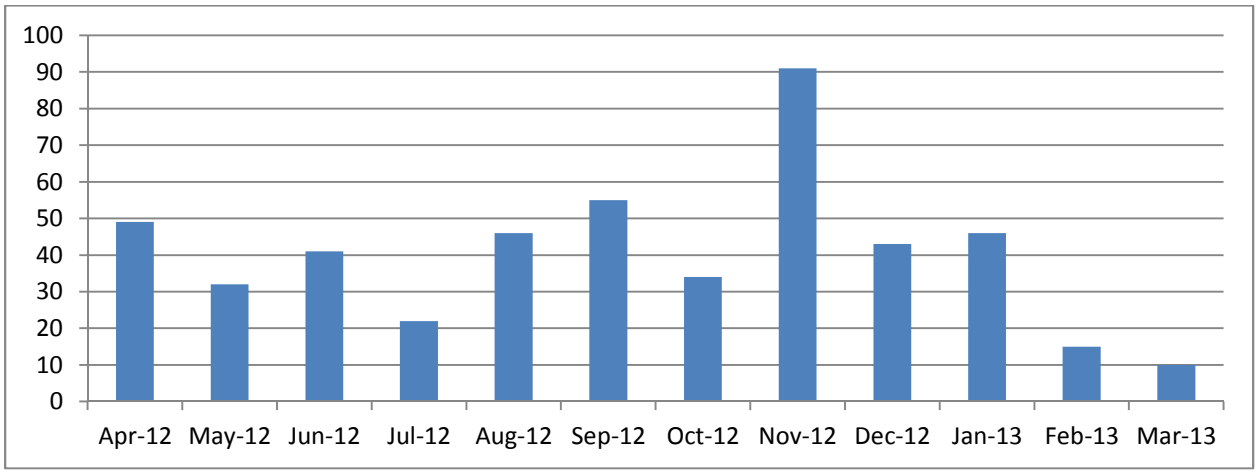
transfer database or the web mapping database using custom built data extraction and loading tools.

- Community Anchor Institute (CAI) Data: The initial list of CAIs were received from the University of Rhode Island and populated into the BBRI database. This data was then compared to and updated using 3rd party datasets in order to create the most comprehensive CAI list available for RI. In order to collect the broadband data for the CAIs, the BBRI Team utilized a top down approach. The agencies that oversaw a large number of CAIs such as RINET and OSHEAN were contacted regarding the data collection. CAIs that still had missing attribute data after contacting these agencies were contact directly via phone and email. Once contacted, the CAIs were directed to an online survey. The online survey walked the user through a short questionnaire that collected the required CAI broadband data. At the end of the survey the user was directed to take a speed test in order to help with the data collection and verification process.

Data Verification – Once the data is loaded into the geodatabase the verification process can begin. This process is comprised of several steps to ensure that the actual facilities and services provided to the public match the provider's data being reported. The steps are listed below, followed by a detailed description of each step.

1. Compared to Available Datasets
    a. Speed test
    b. User feedback
    c. 3rd party dataset analysis
2. Spatial Analysis of Coverage Area
3. Physical Infrastructure Survey
4. Provider Meetings
5. 3rd Party Verification

- Compared to Available Datasets -
    - Speed test – Using Ookla's speed test application, EA has been collecting speed test data for RI since March 2010. A breakdown of speed tests collected over the past year by EA, displayed by month, can be found in the table below. EA uses both the FCC speed tests collected for RI and the speed tests collected on the RI broadband website to get a better view of the actual speeds and coverage area providers are offering the public. The speed tests are geocoded and mapped by provider. (FCC speed test providers are identified by the speed test's IP address) Each provider's speed test data is compared to their stated coverage area. Discrepancies are noted and reported back to the provider. The provider either gives a reason for the discrepancy or instructs us to modify their coverage area to match the speed test data.



- User feedback - user feedback information is captured by both the FCC and RI's broadband mapping website. This information is reviewed on a case by case basis. Changes are made as needed to the data and reported to the provider, similar to the speed test data update process.

- Best practices for final data quality checks include the review and comparison to 3rd party datasets (such as the FCC's 477 data) with the information received from the providers. The FCC's data is used to check for previously unknown providers, perform spatial analysis and comparisons on the data, and to give a better understanding of our confidence in the data. Since FCC data is broken out by census tract the provider's data must be converted to the tract level in order to perform a full data comparison.

- Spatial Analysis of Coverage Area– Spatial Analysis is performed on each provider's data set. The analysis checks for small areas in populated sections of the state that are surrounded by coverage areas but do not show coverage. These "donut holes" in the data are reviewed and reported to the provider if we feel they have a high probability of actually being covered by the providers' broadband services.

- Physical Infrastructure Survey - As part of the expanding need to verify broadband coverage within RI, a physical infrastructure survey pilot project was performed for the Town of Foster. The physical infrastructure survey verified the physical broadband facilities present within the Town. EA performed the survey utilizing GPS equipment and industry knowledge to capture the actual location of strategic infrastructure facilities throughout Foster. The data was then mapped and analyzed to determine where wireline broadband service is theoretically available within the town. Structures outside of the identified theoretical service area were mailed surveys to determine if broadband was actually available at their location as well as collect additional broadband usage information from the residents.

- Provider Meetings - The BBRI Team held conference calls with broadband providers that had significant changes in their current data submittals or had identified issues that required a review. These conference calls were used as working sessions to review reasoning behind changes being made, discuss findings, address questions, and review edits being made to the provider's submitted dataset. Following the meetings, edits to the data were made final based on the information agreed upon. The reason for making each edit to the data was documented in case issues or questions arose in the future.

- 3rd Party Verification – A 3rd party, Mapping & Planning Services (M&PS), is used to do provide an independent review and a report on the status of each provider's data. These reports summarize the data collected and provide a second review of the verification steps listed above.

Data Analysis – In addition to the data verification steps, a complete summary of each provider's data and static broadband coverage maps are created for RIEDC. These maps are used to analyze existing data availability and plan for future broadband development and outreach projects.

Geodatabase Checks– Once the data is processed and verified the database is checked prior to submittal to the NTIA. This process is comprised of several steps to ensure that the information in the geodatabase is as accurate and complete and possible.

- Visual Checks - These visual checks inspect the data to ensure completeness, accuracy, and engineering logic. The visual inspection process employs random sampling techniques to validate feature placement and attribution. The random sampling is performed in accordance with ANSI standards for attribute inspection.

- Automated Checks – These checks are performed on 100% of the data. ESRI's Production Line Tool Set (PLTS) and the NTIA's QC toolbox are utilized for the automated check of the data. PLTS check for both schema and logical errors in the data. The following checks are performed on the data.

    - Geodatabase Format - Verify that the geodatabase's name and feature classes are correct per the corresponding RIEDC data model and NOFA requirements.
    - Coordinate System Errors - Check for proper projection definition.
    - Validity Checks - Verify the attribution fields in the tables and field values fall within the domain specified in the geodatabase.
    - Duplicate Item Values - Verify the uniqueness of attribute values within a user-specified item (such as Feature IDs).
    - Invalid Item Values - Checks for invalid codes using discrete values and ranges defined in the appropriate domain tables.
    - Spatial Logic Checks - Checks the geodatabase to validate minimum size polygons, minimum length lines, and dangles in line feature classes.

- If the geodatabase has passed all tests listed above, and has met the acceptance criteria, the dataset is considered passed and can be processed for delivery to RIEDC and the NTIA. If the geodatabase fails any test and does not meet acceptance criteria, the data is considered failed and will be returned with error reports to the data processing team for correction. Additional follow-up with the providers may be necessary to correct the issue(s). Once edits are completed or exceptions are documented, the geodatabase will be returned to the QC team for an additional sequence of all QC procedures. This process will be repeated until all tests have received a passing status or exceptions have been documented.

OFFICIAL APRIL 2013 UPDATE SUBMISSION TO THE NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION UNDER THE STATE BROADBAND INITIATIVE GRANT PROGRAM FOR THE STATE OF SOUTH CAROLINA

April 1, 2013

TABLE OF CONTENTS

April 1, 2013

Ms. Anne W. Neville
SBI Grant Program Director
National Telecommunications and Information Administration
U.S. Department of Commerce
Room 4716
1401 Constitution Avenue, NW
Washington, DC 20230

Dear Ms. Neville:

As the State Broadband Designated Entity, Connected Nation, in cooperation with South Carolina's broadband provider community, our state-based partners, and the Office of the Governor, is pleased to present this submittal of the state of South Carolina's State Broadband Initiative (SBI) Grant Program, known as Connect South Carolina.

Connected Nation and Connect South Carolina congratulate the National Telecommunications and Information Administration (NTIA) and the Federal Communications Commission (FCC) on achieving the two-year anniversary of the National Broadband Map. Truly, now more than ever, the significance of complete and validated data through this effort is impacting lives in communities all across our great country. The Connect South Carolina program and its collective stakeholder community continue to be faithful and energized contributors, and we are proud to play such a part in forging the innovation economy of the twenty-first century.

The artifacts that comprise this submission should be found to be compliant with the April 1, 2013, deadline for the semi-annual data update and in accordance with the terms of the July 1, 2009, Notice of Funds Availability (NOFA) and all subsequent clarifications pertaining to delivery of state-level mapping of broadband service availability. This packet includes:

Inventory of Deliverables, Connect South Carolina: April 1, 2013

NOFA Requirement	Data Transfer Model	Data Description
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in Census Blocks of No Greater Than Two Square Miles in Area
Appendix A: 1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census Blocks Larger in Area Than Two Square Miles

Appendix A: 1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address
Appendix A: 3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points
Appendix A: 4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing
Appendix A: 4	n/a	Community Anchor Institutions-Narratives
VII.A.1(a)	n/a	Accuracy and Verification Report
n/a	DataPackage.xlsx	Worksheets of Contact Information, Record Count, and Provider Summary Table
n/a	n/a	List of Changes and Corrections to the Dataset
n/a	n/a	Broadband Provider Roster and Participation Status

In addition, this data update submission should be found to be compliant with the additional program requirements instituted by the National Telecommunications and Information Administration since the time of the October 2012 SBI data submission for the Connect South Carolina program. Specifically, these new requirements are:

SBI Data Transfer Model
The submission of the broadband dataset for April 1, 2013, is contained within the SBI Data Transfer Model as released on the Grantee Workspace on December 14, 2012. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information on each provider as possible.

Additional Submission Guidance
On February 8, 2013, NTIA released new guidance regarding the processing of wireless data, for both fixed and mobile broadband providers. All wireless provider coverage records have been reviewed and are in compliance with this grantee guidance for this April 2013 submission period. Even providers that did not have an update for this submission cycle were reviewed and data reprocessed as necessary for those records that were not yet in compliance with the new guidance.

This submission continues to follow the speed technology guidance released by the Program Office on August 9, 2012, to review speed tier codes in correspondence with technology of transmission codes. In the October 2012 submission, descriptions were provided in the methodology paper that offered an explanation for any submitted technology of transmission and speed combinations that were outside of the expected value range. That practice continues in this submission as technology and speed combinations are reviewed and scrutinized; any questionable information supplied by providers is reviewed more in

depth with the provider to ensure the information is accurately captured or a proper explanation is provided as to why the speed information should be submitted as supplied even if it falls outside the expected value range.

This April 2013 semi-annual data update under the SBI Grant Program continues to demonstrate our dedication to implementing the joint purposes of the Recovery Act and the Broadband Data Improvement Act (BDIA) by gathering comprehensive and accurate state-level broadband mapping data, developing state-level broadband maps, aiding in the development and maintenance of the National Broadband Map, and undertaking statewide initiatives for broadband planning.

Broadband Service Availability — Provider Outreach and Verification

This data update submission under the SBI program includes datasets for 97.83 percent of the South Carolina provider community, or 45 of 46 total providers. Of the 45 participating providers, 22 supplied an update to their network or coverage area(s), while 21 have reported no change. The remaining 2 represent providers who previously supplied data but were non-responsive in the April 2013 update effort; therefore, their previous dataset is being put forward as part of this compilation. A complete roster by provider depicting participation status and contact history is contained herein. The remaining provider that is not represented in the attached was non-responsive to multiple contact attempts.

As the aforementioned roster and attached methodology documentation will attest, it is the collective opinion of the Connect South Carolina principals that all commercially reasonable efforts were made to account for 100 percent of the known South Carolina broadband provider community, pursuant to this semi-annual data update submission.

Connect South Carolina has also continued to perform broadband verification activities through several means. In addition to confirmation of service area(s) by each provider, Connect South Carolina conducts field validation efforts. To date, 36 (78.26 percent) providers have been validated through field verification activities. Additional details on verification activities are contained within the Field Validation Methodology.

The Connect South Carolina website, (www.connectsc.org), continues to serve a prominent role in the outreach and data collection effort. This program asset provides a way for the general public to participate in the process by offering interactive tools for users to test their connection speed, submit broadband inquiries, or contact a program representative.

As an indicator of stakeholder penetration, the Connect South Carolina website encountered 2,758 unique visits during this reporting period (19,348 total to date for the life of the grant awarded on December 20, 2009. Additionally, this pronounced Web activity netted 7 broadband inquiries over this same reporting period (145 grant inception to date). The website also provides access to the My ConnectView™ interactive mapping application, which allows consumers and broadband providers to confirm or dispute the coverage represented on the broadband inventory map. These consumer-initiated actions are facilitated through the Connect South Carolina website and the Connect South Carolina interactive mapping tool (My ConnectView™) that offer the stakeholders the vehicles to

provide information regarding availability in their respective service area, either in affirmation or contest of the reported data represented in the Connect South Carolina mapping artifacts. Since the initial data collection and release of corresponding maps, feedback in the form of broadband inquiries has allowed Connect South Carolina to identify additional areas that are in need of field validation, which is scheduled as soon as possible.

Community Anchor Institutions

Connect South Carolina continues to make significant inroads to gather data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. This uptick in CAI data collection was further supported by NTIA's outreach to grantees reiterating the importance of this outreach. With the continued commitment of the state of South Carolina, we have continued to focus on a relationship-oriented approach with state-level agencies and organizations that generates more responses than general contact.

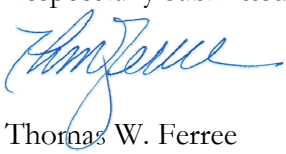
In conjunction with the state of South Carolina, outreach was conducted during this data update reporting period by Connect South Carolina to continue identification of existing, centralized sources for CAI connectivity data. Additionally, outreach was coordinated to distribute the CAI survey to institutions throughout the state through multiple methods including a customized online survey available on the Connect South Carolina website. Building on past success of the September 2012 Education Campaign, February 2013 was recognized as Public Safety Month where the public safety sector was the focus of CAI data collection, research, and public affairs outreach. Connect South Carolina has developed new relationships with statewide associations such as the South Carolina State Firefighters Association and re-engaged existing partners including the South Carolina Municipal League and the South Carolina Association of Counties, to promote the importance of broadband connectivity at anchor institutions and participation in this data collection process. The value of these relationships continues to impact the entire success of the Grant Program, and the CAI engagement is a logical extension of new and existing relationships. Connect South Carolina will continue to build upon these new relationships over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

From our work in South Carolina, as well as other states, we recognize the great value of this data to future collaboration efforts within the state as well as its value to the National Broadband Map. We plan to continue to bring best practices to the Connect South Carolina efforts, along with an investment of both human and technical resources required to reach our goal of increasing the data that is secured and reported as part of this process.

The Connect South Carolina program exists to improve data on the deployment and adoption of broadband services and to assist in the extension of broadband technology across all regions of the

great state of South Carolina, as well as the United States and its territories through contribution to the National Broadband Map. We look forward to the continuing work ahead and improving upon our data collection methods.

Respectfully submitted,



Thomas W. Ferree
President and Chief Operating Officer
Connected Nation, Inc.

SOUTH CAROLINA COMMUNITY ANCHOR INSTITUTIONS METHODOLOGY

In this seventh reporting period of the SBI, Connect South Carolina, working in close coordination with the state of South Carolina, has established an ongoing mechanism for gathering data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. Since the October 2012 data submission, the CAI outreach process method has been modified to improve data collection. Specifically, the outreach process is a more focused sector-specific and relationship-oriented approach that generates more responses than general contact.

Connect South Carolina has continued to identify and process CAI data obtained through an ongoing statewide outreach campaign. Physical address information continues to be augmented through manual sourcing and geocoded by Connect South Carolina through Esri ArcGIS software.

Connect South Carolina continues to utilize a customized online survey hosted through SurveyMonkey, with a landing page on the Connect South Carolina website that was developed during the first reporting period. This survey, in combination with a customized data-gathering spreadsheet, was distributed on a regular basis to a targeted list of CAI throughout the state as well as organizations and agencies that work closely with the CAI. The distributions were completed with the support of the state client. Connect South Carolina will continue to use these data-gathering tools for future targeted outreach efforts throughout the coming months leading up to the next reporting period. These materials are customized to fit the CAI categories as defined in the SBI NOFA.

The survey can be accessed at this link: http://www.surveymonkey.com/s/RJH5DMW.

In addition to the survey, Connect South Carolina has developed a number of new relationships with statewide associations, such as the South Carolina Municipal League and the South Carolina Association of Counties, to promote the importance of broadband connectivity at Community Anchor Institutions and participation in this data collection process. It is apparent that these relationships are beneficial to the entire success of the grant program, and the CAI engagement is a logical extension of new and existing relationships. Connect South Carolina will continue to build upon these new relationships over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

In addition to fostering and building relationships with state agencies, associations, and organizations, Connect South Carolina has also developed a sector-specific calendar that supports CAI outreach as well as research and communications efforts. This focused approach allows a corporate commitment to capturing CAI data in addition to developing meaningful sector-specific content. Since the October 2012 submission, the sector-specific approach included a month-long public safety campaign in February 2013. During this campaign, Connect South Carolina committed to improve relationships with key stakeholders, distribute survey requests to sector representatives, and provide sector-specific education through communications and webinar resources. Outreach to and survey of hospitals, local law enforcement, and fire stations helps build awareness and establishes a centralized database of key connectivity data for planning.

Connect South Carolina conducts significant research as part of an ongoing process to identify existing, centralized sources for CAI connectivity data. In tandem with these efforts to identify existing data, Connect South Carolina continues to identify key CAI contacts in an effort to distribute and promote the online survey and raise awareness of the importance of CAI broadband connectivity. Also, when possible, Connect South Carolina works to identify existing relationships that can support CAI outreach.

Connect South Carolina has an ongoing mission to educate CAI throughout the state on the importance of participating in the project. Participation by these institutions will raise awareness about the importance of broadband connectivity and the need to report the requested data for inclusion on the National Broadband Map.

The greatest challenge with collecting CAI data continues to be educating the CAI about the Connect South Carolina project as well as self-awareness of their own broadband connectivity (specifically upload and download speeds). Connect South Carolina will continue to research key CAI organizations and agency contacts in an effort to raise awareness of this project among CAI.

A CAI summary of all processed and submitted data is provided below:

CAI Type	Total	Physical Address	Lat/Long	Technology of Transmission	Download Speed	Upload Speed
K-12 Schools	1758	1758	1752	1098	1097	1097
Libraries	284	284	284	184	183	183
Healthcare	295	295	295	198	199	199
Public Safety	793	793	790	336	310	309
Higher Ed Institutions	232	232	232	139	137	137
Other Government	944	944	943	865	864	864
Other Non-Government	98	98	98	86	86	85
Total	4404	4404	4394	2906	2876	2874

During the coming months, CAI data collection will be supported by regular reporting to the Connect South Carolina team. The CAI data is proving an invaluable resource to all components of the Connect South Carolina effort. The data identifies potential local champions, sector trends, and opportunities for improvement as well as opportunities to educate CAI not familiar with their current connectivity.

SBI Data Submission Methodology

The submission of the broadband dataset for April 1, 2013, is contained within the SBI Data Transfer Model and additional components as released on the Grantee Workspace on December 14, 2012. Connected Nation (CN) has reviewed all literature that relates to the release and use of this

data transfer model and recognizes that it does not replace or dictate how data is stored, processed, or displayed for the state, as it is meant primarily as a means to transfer the broadband data from all states and territories and populate the National Broadband Map in a seamless fashion.
Connected Nation has complied with the following guidance documents published by NTIA:

- Technical Mapping Guide, as released on the Grantee Workspace on March 24, 2011, was followed to ensure the completeness and validity of the submission through completion steps and checklists, completing the DataPackage spreadsheet, uploading broadband datasets into the Data Transfer Model, and checking the dataset using the SBDD_CheckSubmission receipt process.
- Naming Conventions and Category of End User, as released on the Grantee Workspace on March 26, 2012, was followed to ensure the consistency of individual file and zip package naming.
- Wireless Data Processing Guidance, as sent to SBI grantees on February 8, 2013, was followed to ensure that all fixed and mobile wireless provider coverage records are submitted to NTIA as separate, closed polygons whenever there is a variation in any of the required fields.

In addition to the methodologies contained herein, the Changes and Corrections documentation, as well as the DataPackage.xls containing contact information, the data dictionary, and a provider summary table, the following feature classes are submitted within the SBI Data Transfer Model for the state of South Carolina.

Inventory of Deliverables, Connect South Carolina: April 1, 2013

NOFA Requirement	Data Transfer Model	Data Description
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in Census Blocks of No Greater Than Two Square Miles in Area.
Appendix A: 1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census Blocks Larger in Area Than Two Square Miles.
Appendix A: 1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address.
Appendix A: 3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points.
Appendix A: 4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing.

The provider data collected by CN on behalf of the state of South Carolina have been formatted per the given specifications and uploaded into the appropriate feature classes of the SBI Data Transfer Model. Wireline availability is contained within census blocks and road segments, wireless availability is contained as polygons of coverage areas, and middle-mile connections and Community Anchor

Institutions are contained as point data. All speed data is contained at the census block, road segment, or wireless polygon level of availability. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information as possible.

Connected Nation has continued outreach to satellite providers on their availability, technology, and speed information, but granular coverage is not yet available. Submitted within the wireless feature class are the satellite companies providing service to South Carolina as a polygon of the state boundary. Efforts will continue to collect, process, or otherwise create more granular satellite data based on availability analyses and guidance received from NTIA. Process development continues as well to be able to create more granular satellite coverage based on satellite equipment positioning and geographic inputs.

DATASETS FOR IN-KIND MATCH

Connect South Carolina received an in-kind match contribution to assist with SBI mapping goals which has been beneficial to the program in the following ways:

Connect South Carolina received a Community Anchor Institution (CAI) connectivity information dataset for a variety of institution types including higher education, state and local governments, public safety, and more from the South Carolina Budget and Control Board - Department of State Information Technology as part of an in-kind match contribution to Connect South Carolina - $107,548.

Connect South Carolina received a CAI dataset for schools and libraries from the South Carolina Budget and Control Board - Department of State Information Technology as part of an in-kind match contribution to Connect South Carolina - $71,232.

SOUTH CAROLINA FIELD VALIDATION METHODOLOGY

CN focused a portion of its time on specific validation processes such as:

- conducting random spectrum analysis studies throughout the state using an Avcom PSA-37-XP spectrum analyzer;
- conducting mobile speed tests throughout the state using an iPhone, Android (or other smart phone) as well as provider-specific aircards (Sprint 3G/4G, Clearwire et al);
- identifying pre-selected, provider-submitted wireless transmit tower sites and cross-referencing data about that tower against the Federal Communications Commission (FCC) databases such as Antenna Structure Registration and/or the Universal Licensing System;
- cross-referencing Federal Registration Number data against available FCC Form 477 data as well as the FCC **CO**mmission **RE**gistration **S**ystem (CORES);

- validating provider submitted data (for example: latitude/longitude) using a handheld Garmin eTrex Summit GPS unit or GPS enabled software such as Microsoft *Streets & Trips*;
- locating physical wire-line attributes (such as Central Offices, Remote Terminals, CATV plant, etc.) and comparing them against provider submitted data; and
- conducting on-net and off-net speed tests using the FCC portal at http://www.broadband.gov/qualitytest/about/ or using the Ookla Net Metrics enabled speed test utility located on each of CN's program specific websites.

Additionally, CN cross-referenced numerous public documents in order to ensure that all known broadband providers were located and contacted. This included searching membership logs from trade associations (WISPA, WCAI, PCIA, etc.), the Cable Television Fact Book, Public Utility Commission records, Public Service Commission records, Chamber of Commerce, etc.

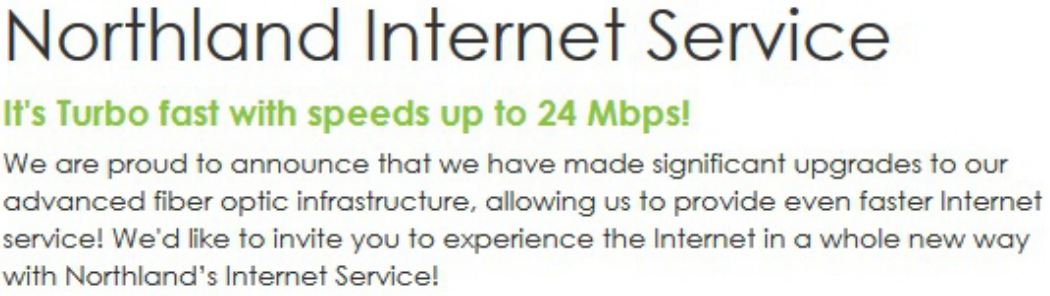
To date, Connected Nation's staff conducted on-site validation tests in South Carolina on the following providers: AT&T; Atlantic Broadband; CenturyLink; Charter Communications; Chesnee Telephone Company; Chester Telephone Company (d.b.a. Fairfield Communications); Clearwire Corporation; Comcast; Countrywide Wireless; Electronics Service Company of Hamlet LLC; Family View Cable; Farmers Telephone Cooperative Inc. (d.b.a. FTC Communications); Frontier Communications of the Carolinas; Hargray Communications Group; Harron Communications (d.b.a. MetroCast); Home Telephone Company Inc.; Horry Telephone Cooperative Inc.; Northland Communications Corporation; NTInet Inc.; Palmetto Rural Telephone (d.b.a. Low Country); Pee Dee Online; PRT Communications; Rock Hill Telephone Company (d.b.a. Comporium Communications), PBT Communications, and Fort Mill Telephone Company); Sandhill Telephone Cooperative; SkyRunner; Southern Coastal Cable; Sprint; TDS Telecom; Time Warner Cable Inc.; T-Mobile; tw telecom; US Cellular; Verizon South Inc.; West Carolina Telephone; Wide Open West (formerly d.b.a. Knology); and Windstream.

From program initiation through this reporting period, CN has completed in-the-field validation testing against 36 companies (out of a universe of 46 viable providers) totaling 78.26 percent within the state of South Carolina.

CN has also continued to review provider datasets for accurate speed information, platform listings, and other intricacies that may fall outside of the standard SBI Data Transfer Model parameters, as published on the NTIA Grantee Workspace on December 14, 2012. Any providers whose submitted coverage and attributes are anticipated to come into question have been further reviewed and confirmed; details on a case-by-case basis are presented below.

Comcast Cable Communications, LLC
Issue: Technology of transmission code 40 with maximum advertised download speed in tier 7, lower than expected value range for the technology.
Resolution: Confirmed use of DOCSIS 3.0 with speed tier 7. Speeds are kept lower currently to be backwards compatible.

Northland Communications Corp.
Issue: Technology of transmission code 40 with maximum advertised download speed in tier 7, lower than expected value range for the technology.
Resolution: Provider website advertises up to 24 Mbps service; screenshot below.



PROVIDER VALIDATION METHODOLOGY

Broadband providers maintain their service area data in many different formats, all in varying levels of complexity and granularity. In order to ensure that the data required by the NTIA is standardized across all providers and that it is as accurate as possible, CN translates and formats the data that providers are able to supply into a GIS shapefile and produces maps for the provider to review. The resulting map(s) and review process allow for providers to see their service area in a geographic format – for some providers, this is the first time they have seen maps of their broadband service area. Having the mapped service area allows providers to quickly identify any issues that appear in the data representation, whether the issue is in the data translation into a GIS format or from the original data collection and submission. Often data is provided from various sources and through the review and revision process, local engineers who operate the networks and work in the field are able to ensure that the tabular data that has been submitted is accurate and represents the real-world network extent. Any issues in how the service area is represented on the map(s) are remedied by CN, whether they are additions, removal of service, or any other revisions. Revised maps of service area representations are sent to the provider for review and approval; CN will revise data and return maps as many times as necessary until the provider is in agreement that the map represents their service area as accurately as possible. Once the review process has been completed and final approval of the data is provided, the data is deemed ready for NTIA submission.

Once the data collection has been aggregated at a statewide level, static maps of statewide and county-level availability are produced and made publicly available. In addition, consumers can visit the interactive online tool, My ConnectView, to create customized views of broadband service areas and analyze corresponding demographic information. Leveraging broadband service data on various platforms allows for public users, providers, and other stakeholders to review, scrutinize, and provide feedback on the represented data. This feedback becomes a validation method in itself, as consumers submit inquiries to CN either affirming where service is not available or identifying areas where broadband service is shown on the map, but in actuality is not available. This allows for a follow-up to providers regarding revisions to the data as it is represented; it also allows for CN to

identify locations where on-site visits may be necessary to complete field validation of available services. Public feedback on all forms of mapping products serves as a localized validation method for provider-supplied information and allows CN to resolve inaccuracies as they are identified to ensure that only the highest quality information is provided to stakeholders.

Estimates derived from provider-validated data indicate that approximately 3.15 percent of South Carolina households do not have terrestrial fixed broadband service available, and approximately 0.10 percent of South Carolina households have neither mobile nor fixed broadband service available.

Within rural areas of the state, results derived from provider-validated data indicate that approximately 4.08 percent of rural South Carolina households do not have terrestrial fixed broadband service available, and approximately 0.13 percent of rural South Carolina households have neither mobile nor fixed broadband service available. Please note that the availability estimates presented are based on Census 2010 household information.

The estimates above, in accordance with NTIA's definition of available broadband service as specified in the SBI NOFA, include broadband service with download speeds of at least 768 Kbps and upload speeds greater than 200 Kbps.

In addition, due to the nature of the SBI data collection methodology as defined by the NTIA and based on both census block geographic units and street segment data, the estimates of broadband availability derived from provider-validated data may include an overstatement of the actual number of households with broadband availability. Under the census block-based data collection method, a provider will typically report broadband availability for an entire census block whether its network is present across the whole or only a subset of that census block. This potential overestimation at the census block level can be amplified as the data is aggregated across the entire state.

WIRELESS METHODOLOGY

Broadband Service Availability in Provider's Service Area
Wireless Services Not Provided to a Specific Address

Data solicited from a fixed wireless provider to create propagation models include, but are not limited to:

1. The name of the structure.
2. Whether the transmitting device is operational or proposed.
3. The maximum advertised downstream speed, the maximum advertised upstream speed.
4. The typical downstream speed, the typical upstream speed (peak periods for both).
5. The frequency range of spectrum being used (as prescribed by NTIA). This may include (but is not limited to) spectrum authorizations identified within the Federal Communications Commission (FCC) Universal Licensing System (ULS) database or located on the FCC's Spectrum Dashboard.

6. The primary population center(s) being served (for geopolitical boundary reference).
7. The physical address of the transmit site (in the event latitude/longitude is unavailable from the provider this allows a quick reference point for geocoding).
8. Latitude in either Degrees, Minutes, and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
9. Longitude in either Degrees, Minutes and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
10. Antenna pattern (e.g. omnidirectional, 180°, 120°, 90°, etc.).
11. Azimuth of antenna (e.g. 360° with magnetic declination if known).
12. Approximate transmit radius (in feet, miles, or kilometers).
13. Polarity of transmit antenna (Vertical or Horizontal).
14. Transmit antenna gain (in dBi).
15. Line loss (applicable only to providers using coax, heliax, waveguide or other forms of cabling – excludes power-over-Ethernet devices).
16. Mechanical and/or Electrical beam tilt (if applicable).
17. Equipment Manufacturer (allows easy cross-reference against manufacturer's specification sheet).
18. Power output of the transmitting device (if unknown, FCC standards or manufacturer specifications are applied).
19. AMSL at base of tower site.
20. Antenna centerline AGL (height of antenna above ground level measured at the centerline of the actual antenna).
21. Foliage factors (Evergreens/Deciduous and percent of ground cover).
22. Ground Clutter (primarily used in rural areas to account for foliage and in metropolitan areas to account for types and heights of buildings if known).
23. Average gain of receive antenna.
24. Receive antenna is estimated at height above average terrain (HAAT) of 6.2 meters/20 feet.
25. Federal Registration Numbers (if applicable) which may allow opportunities to cross-reference and/or obtain additional data from the FCC's ULS and the **CO**mmission **RE**gistration **S**ystem.

Propagation modeling combines scientific data and empirical mathematical formulation for the characterization of radio wave propagation as a function of frequency, distance, and other conditions. Propagation software(s) typically use the Irregular Terrain Model (also known as Longley-Rice) of radio propagation for frequencies between 20 MHz and 20 GHz. This model is based on electromagnetic theory and statistical analyses of the combination of terrain features and radio measurements, then predicting the median attenuation of a radio signal as a function of distance and the variability of the signal in time and in space. For metropolitan areas, the software can typically be adjusted to use the Okumura-Hata model, which accounts for predicting the behavior of cellular transmissions in areas where buildings are the primary obstructions. The

resulting product from either model depicts a graphical illustration of the theoretical propagation characteristics of a selected frequency range based on defined variables (receiver sensitivity of the home/mobile device, foliage factor, and digital elevation terrain input).

After converting propagation models into a geospatial format, additional processing is completed to remove the small pixels representing service present in the resulting dataset. These areas are initially created based on the parameters entered in the software from the provider equipment information, the underlying data parameters of elevation, hill shade, etc., and the limitations of the software itself to display a broadband service area as accurately as possible. Generally, these random pixel striations appear as a result of signal levels reaching the highest elevated points within the prescribed radius. Typically, while this pixilation anomaly shows legitimate areas where signals can be received, these highly elevated points may have exceedingly sparse populations or are entirely void of population. As a result, and congruent to the *Wireless Technology Methodologies and Business Logic* white paper submitted to NTIA on January 20, 2011, all independent pixels representing service that are less than 0.125 square miles in area have been removed from the geospatial representation of each wireless provider.

BROADBAND INQUIRIES METHODOLOGY

CN collects consumer feedback in the form of broadband inquiries (BBIs). These inquiries represent any type of communication received from the public regarding broadband service. Once BBIs are received across the state, this information is overlaid with the broadband availability information which was collected through the SBI program. This allows for a real-world comparison of the broadband landscape to the information received from broadband inquiries. Consumers submitting these inbound comments and/or inquiries are able to provide information regarding five categories: 1) residents who do not have broadband but want it; 2) residents who have broadband but want a different provider; 3) residents who do not have broadband, but the broadband inventory maps indicate that they do; 4) residents who have broadband but want a faster connection speed; and 5) residents who have broadband but want a less expensive service option.

BBIs are submitted frequently by consumers via the Connect South Carolina website. Inquiries often seek help to identify local broadband provider options, or to learn when a specific provider may be able to provide service to that consumer. Consumer comments also provide information which may help modify maps with actual service area information. The primary objectives of CN regarding these inquiries are 1) to improve the accuracy of the state maps with submitted consumer information and follow-up field research; 2) to provide broadband options to consumers through cooperation with mapped providers and by facilitating new broadband service options; and 3) to map and analyze information from consumers about areas of unmet broadband demand and alternatives to currently mapped services. A prime example of the second option is the utilization of the Rural Utility Service satellite eligibility tool. By simply entering the consumer's address, the CN engineer can quickly determine if the consumer meets the initial qualification status for BIP satellite subsidies.

New BBIs are assigned to either the GIS department or the Engineering & Technical Services (ETS) team depending on the category entered by the consumer on the website submission form. The GIS or ETS team members respond to each inquiry according to the information entered by the consumer. Many BBIs can be resolved through desktop research; however, if a BBI requires research in the field, the assigned ETS team member conducts such research when performing field validations in the area of the inquiry, or at another such time as is practical and appropriate. GIS and ETS team members respond to and conclude BBIs via telephone contact and/or e-mail communication.

The broadband inquiry process has been implemented in each of the CN state programs with successful results. Altogether CN has received over 18,839 broadband inquiries since 2007, allowing the state programs to evaluate each inquiry for broadband demand and data verification. These inquiries are continuously examined against current broadband availability, updated every six months, to determine if previously unserved households have been expanded to and can now receive broadband at their residence. This database of broadband inquiries has also allowed the CN state programs to aggregate demand in concentrated areas to show providers the exact locations where the population has made it clear that they would purchase broadband if it was made available to them. Providers in the states have responded to this process and have expanded to areas knowing that their investment will be worthwhile. Data verification methods have also proven successful, as the state programs have been able to show those inquiries that indicate the broadband service areas are misrepresented on the map to providers, who then verify where service cannot reach in regard to that residence(s). The broadband coverage in these states has been altered to create a more accurate map based on the inquiries submitted by the public.

During this reporting period, the Connect South Carolina project has received a total of 7 inquiries (145 grant inception to date). As more inquiries are submitted to Connect South Carolina, a more thorough validation of the broadband landscape can be performed, while also allowing providers to see which areas have a high demand for broadband adoption.

MY CONNECTVIEW METHODOLOGY

My ConnectView is an interactive online mapping tool for viewing, analyzing, and validating broadband data. Developed using Esri's ArcGIS for Server and Adobe's Flex Framework and hosted and maintained by Connected Nation, My ConnectView is a multi-functional, user-friendly way for local leaders, policymakers, consumers, and technology providers to devise a plan for the expansion and adoption of broadband.

First and foremost, My ConnectView allows consumers to locate their residence and identify providers that offer broadband Internet service to that location. The interactive platform allows for users to build and evaluate broadband expansion scenarios using a wealth of data, including several coverage analysis layers, speed analyses, Community Anchor Institutions, and tools to search and export household demographic information, as well as extract data in GIS, spreadsheet, and/or PDF formats.

My ConnectView also features more interactive data layers and additional tools than ever before to allow the consumer to explore the broadband data. My ConnectView provides consumers with the ability to print, e-mail, and provide feedback on the broadband data displayed on the interactive map. Through the collection of this feedback, a visual demand for broadband is presented. This visualization allows the CN state programs the ability to validate the broadband availability for accuracy. If residents within a region state they are without broadband, but the interactive map shows otherwise, this allows CN to approach the providers within that area in an effort to trim down their coverage to more accurately represent real-world availability on the ground.

The Connect South Carolina project launched My ConnectView on April 2, 2012, and has received 428 visits this reporting period; to date the interactive mapping application has received 7,690 visits.

SPEED TEST METHODOLOGY

The 133 speed tests that are represented in the Connect South Carolina Speed Test Report during this reporting period (641 grant inception to date) are the result of a partnership between CN and Ookla Net Metrics. Utilizing this relationship increases the level of confidence in the data being collected and provides for a far greater sample size than could be collected by a single testing site.

Ookla owns and operates Speedtest.net, as well as develops and deploys speed tests, such as the Connect South Carolina speed test website, for partners around the world. This network of sites that is developed and run on its testing technology provides Ookla with a vast dataset that, due to the variability of geographic information collected across the varying speed test sites, is geocoded utilizing Geo-IP technology. This technology allows for tests to be geocoded to points of aggregation, typically larger nodes across provider networks. While there are hundreds of thousands of tests that have been conducted, the level of aggregation is only sufficient for county-level detail due to the test results being located at these larger nodes and not at an absolute location for each speed test.

In an effort to validate broadband data from the Connect South Carolina project, speed test information is collected throughout the state. Speed tests provide speed information on the path taken through all networks (a provider's network as well as additional networks) a local machine must connect to in order to reach the host test. The benefit of this collection of speed information is two-tiered. First, it allows for a comprehensive dataset of speeds, while also providing Connect South Carolina with the information on where broadband services are available. Second, unlike theoretical speed information which may be received through the data collection process, the use of speed tests provide real-world information on the speeds that currently exist within the state of South Carolina.

PROVIDERS DEEMED NON-VIABLE

The following list of companies represents the remainder of the broadband provider universe that was originally identified as complete for outreach to begin for the State Broadband Initiative. These providers are not included in the Data Package for the April 2013 submission because they have been deemed non-eligible under the parameters and guidance of the SBI grant program. This list of companies includes, but is not limited to: providers offering service but below the current definition of broadband, those that have gone out of business, technology consulting firms, infrastructure or network construction companies, non-facilities based general resellers, etc.

	Company Name	URL	Comments
1	ACSinc.net	www.acsinc.net	This company does not provide residential Internet service.
2	Aero Networks	www.aeronetworks.net	This company does not provide Internet services in the state.
3	Aerolina Wireless Networks	www.aerolina.com	This company provides commercial services only.
4	Airespring, Inc.	www.airespring.com	This company is a non-facilities-based reseller.
5	Airimba	website not operational - www.airimba.com	This provider offers service to select MDUs.
6	Beyond Communications	www.discoverbeyond.com	This provider offers service to select MDUs and HOAs, but not to public communities; non-responsive to multiple attempts.
7	Birch Communications	www.birch.com	This company does not provide residential Internet service.
8	Broadstar	www.broadstar.com	This provider offers service to select MDUs.
9	Broadview Networks Holdings, Inc.	www.broadviewnet.com	Non-facilities-based reseller to businesses.
10	Community Connect	unknown	This company does not provide residential Internet services.
11	Contractdata.net	n/a	This company is out of business.

12	County of Oconee	www.oconeefocus.com	BIP recipient promotes the construction of a fiber optic broadband network in the county.
13	Digital Bridge	www.bridgemaxx.com	This company does not provide Internet services in the state.
14	Genesis Telecommunications	www.genesistelcom.com	Dial-up services in Greenwood only.
15	Global Crossing Telecommunications, Inc.	http://www.globalcrossing.com	Acquired by another company.
16	Grand Strand Communications	n/a	This company is out of business.
17	Hickory Tech Corporation	www.enventis.com	B2B services.
18	Hotwire Communications	www.gethotwired.com	Offers residential service to one multi-dwelling unit.
19	LightEdge Solutions, Inc.	www.lightedge.com	Illinois provider; no service in SC.
20	Lightyear Network Solutions, LLC	www.lightyear.net	Non-facilities-based reseller.
21	Main Street Wireless	http://www.mainstreetsc.com	Provider may no longer be in business.
22	MegaPath Inc.	www.megapath.com	This company does not provide Internet services in the state.
23	Metropolitan Telecommunications Holding Company	www.mettel.net	Non-facilities-based reseller of business services.
24	Net Doctors	www.netmds.com	This company does not offer high-speed Internet; dial-up only.
25	New Edge Network, Inc.	www.newedgenetworks.com	Acquired by Earthlink. Company does not offer residential service; resells backhaul.
26	NuVox, Inc.	n/a	Acquired by another company.

27	Open Range Communications, Inc.	http://www.openrangecomm.com	No longer in business.
28	PAETEC Communications, Inc.	http://www.paetec.com/	Acquired by another company.
29	Pee Dee Net	website not operational - www.pdnet.net	This company does not provide residential Internet services.
30	Personally Complete	www.personallycomplete.com	This company does not provide Internet access.
31	Pine Tree Cablevision	www.ptc-me.net	This company is out of business.
32	PM Broadband	www.pmcol.com	This company is out of business.
33	Qwest Communications Company, LLC	www.qwest.net	Acquired by CenturyLink.
34	Shentel Converged Services, Inc.	www.shentel.com	This company is a private cable provider serving a few campuses and related MDUs, but not public residences.
35	Techcore Consultants II	www.almega.com	This company is no longer in business in South Carolina.
36	TeleSouth Wireless	www.telesouth1.com	The company appears to be out of business.
37	Telovations, Inc.	www.telovations.com	This company does not provide residential Internet services.
38	Tri-County Electric	www.tri-countyelectric.net	This company does not provide residential Internet services.
39	University Corporation for Advanced Internet Development	www.internet2.edu	This consortium is a BIP/BTOP recipient with no Internet network.
40	WilTel Communications, LLC.	n/a	Acquired by Level 3.
41	WP Media	www.wpmedia.com	This company is a consulting firm.
42	Zayo	www.zayo.com	Not a broadband provider in this state.

APPENDIX A: BROADBAND PROVIDER LOG

Broadband Provider Log

Complete	100
Non-Responsive/Refused	1
In Progress	1
Reseller Providing Data	0
Count of Datasets by Status	**102**
Total Unique Providers Represented	**46**

Provider Name	Platform	Status	NDA Execution Date	Notes
AT&T Inc.	DSL	Data Added to Statewide Inventory	12/16/2009	[FEB-14-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
AT&T Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/16/2009	[FEB-13-13 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Atlantic Broadband, LLC	Cable	Data Added to Statewide Inventory	2/3/2010	[FEB-11-13 Matthew Brunt] Change: Provider expanded cable coverage area.
CenturyLink	DSL	Data Added to Statewide Inventory	12/4/2009	[FEB-14-13 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Charter Communications, Inc.	Cable	Data Added to Statewide Inventory	12/15/2009	[FEB-14-13 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Electronics Service Company of Hamlet, LLC	Fixed Wireless	Data Added to Statewide Inventory	3/24/2010	[FEB-19-13 Matthew Brunt] Change: Provider added one tower which provides Tier 5 download speeds.
Farmers Telephone Cooperative, Inc.	Fiber	Data Added to Statewide Inventory	1/22/2010	[FEB-11-13 Matthew Brunt] Change: Provider expanded fiber coverage.
Farmers Telephone Cooperative, Inc.	Fiber	Data Added to Statewide Inventory	1/22/2010	[FEB-11-13 Matthew Brunt] Change: Provider expanded fiber coverage.
Farmers Telephone Cooperative, Inc.	Mobile Wireless	Data Added to Statewide Inventory	1/22/2010	[FEB-11-13 Matthew Brunt] Change: Provider expanded mobile coverage.
Frontier Communications Corporation	DSL	Data Added to Statewide Inventory	1/22/2010	[FEB-18-13 Matthew Brunt] Change: Provider added new DSLAM locations.
Horry Telephone Cooperative, Inc.	DSL	Data Added to Statewide Inventory	1/22/2010	[JAN-17-13 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Horry Telephone Cooperative, Inc.	Cable	Data Added to Statewide Inventory	1/22/2010	[JAN-17-13 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Horry Telephone Cooperative, Inc.	Fiber	Data Added to Statewide Inventory	1/22/2010	[JAN-17-13 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Horry Telephone Cooperative, Inc.	Mobile Wireless	Data Added to Statewide Inventory	1/22/2010	[JAN-17-13 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Leap Wireless International, Inc.	Mobile Wireless	Data Added to Statewide Inventory	4/6/2010	[FEB-12-13 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Northland Communications Corp.	Cable	Data Added to Statewide Inventory		[FEB-11-13 Matthew Brunt] Change: Provider changed technology type to 40. Speeds upgraded to Tier 7 download and Tier 5 upload, and provider expanded cable coverage.
Skycasters	Satellite	Data Added to Statewide Inventory	10/16/2012	[DEC-04-12 Matthew Brunt] Correction: Initial submission of provider's coverage, but they were in service previously.
Sprint Nextel Corporation	Mobile Wireless	Data Added to Statewide Inventory	1/14/2010	[FEB-12-13 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
T-Mobile USA, Inc.	Mobile Wireless	Data Added to Statewide Inventory	1/8/2010	[FEB-17-13 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
TDS Telecommunications Corporation	DSL	Data Added to Statewide Inventory	1/27/2010	[FEB-20-13 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.

Time Warner Cable Inc.	Cable	Data Added to Statewide Inventory	12/21/2009	[AUG-20-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission. Time Warner has changed their reported provider name to "Time Warner Cable Inc." and their FRN to 0007556251.
Verizon South Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/14/2009	[FEB-13-13 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
West Carolina Rural Telephone Cooperative, Inc.	Fiber	Data Added to Statewide Inventory	1/22/2010	[JAN-17-13 Matthew Brunt] Change and Correction: Provider indicated that some fiber coverage was being displayed within city limits incorrectly. Provider also upgraded speeds to tier 8 download.
Conterra Ultra Broadband Holdings	Backhaul	Backhaul Provider Only Processing Complete	11/8/2011	
Level 3 Communications, LLC	Backhaul	Backhaul Provider Only Processing Complete	12/14/2009	
Hughes Network Systems, LLC	Satellite	Speed Only Update; Data Processing Complete	2/5/2010	[MAR-06-13 Matthew Brunt] Change: Provider now offers tier 7 download speeds.
West Carolina Rural Telephone Cooperative, Inc.	DSL	Speed Only Update; Data Processing Complete	1/22/2010	[FEB-19-13 Matthew Brunt] Change: Provider upgraded speeds to tier 8 download.
Windstream Communications	DSL	Speed Only Update; Data Processing Complete	1/20/2010	[MAR-01-13 Matthew Brunt] Change and/or Correction: Provider sent updated speeds for portions of their service area.
Comcast Cable Communications, LLC	Cable	Approval for Update Not Received – Data Still Submitted	12/7/2009	[FEB-20-13 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
AT&T Inc.	Backhaul	No Update to Provide	12/16/2009	
CenturyLink	Backhaul	No Update to Provide	12/4/2009	
Charter Communications, Inc.	Backhaul	No Update to Provide	12/15/2009	
Chesnee Telephone Company, Inc.	Cable	No Update to Provide	1/25/2010	
Chesnee Telephone Company, Inc.	DSL	No Update to Provide	1/25/2010	
Clearwire Corporation	Mobile Wireless	No Update to Provide	3/17/2011	
Countrywide Wireless	Fixed Wireless	No Update to Provide		
DeltaCom, Inc.	Backhaul	No Update to Provide	2/16/2010	
Family View CableVision	Cable	No Update to Provide		
Farmers Telephone Cooperative, Inc.	Backhaul	No Update to Provide	1/22/2010	
Farmers Telephone Cooperative, Inc.	Backhaul	No Update to Provide	1/22/2010	
Farmers Telephone Cooperative, Inc.	DSL	No Update to Provide	1/22/2010	
Farmers Telephone Cooperative, Inc.	DSL	No Update to Provide	1/22/2010	
Frontier Communications Corporation	Fiber	No Update to Provide	1/22/2010	
Hargray Communications Group, Inc.	Backhaul	No Update to Provide	1/25/2010	
Hargray Communications Group, Inc.	Backhaul	No Update to Provide	1/25/2010	
Hargray Communications Group, Inc.	Backhaul	No Update to Provide	1/25/2010	
Hargray Communications Group, Inc.	Cable	No Update to Provide	1/25/2010	
Hargray Communications Group, Inc.	Cable	No Update to Provide	1/25/2010	
Hargray Communications Group, Inc.	DSL	No Update to Provide	1/25/2010	
Hargray Communications Group, Inc.	DSL	No Update to Provide	1/25/2010	
Hargray Communications Group, Inc.	Fiber	No Update to Provide	1/25/2010	
Harron Communications LP	Cable	No Update to Provide		
Home Telephone Company, Inc.	Backhaul	No Update to Provide	1/22/2010	
Home Telephone Company, Inc.	Backhaul	No Update to Provide	1/22/2010	
Home Telephone Company, Inc.	Cable	No Update to Provide	1/22/2010	
Home Telephone Company, Inc.	Cable	No Update to Provide	1/22/2010	
Home Telephone Company, Inc.	DSL	No Update to Provide	1/22/2010	
Home Telephone Company, Inc.	Fiber	No Update to Provide	1/22/2010	
Home Telephone Company, Inc.	Fiber	No Update to Provide	1/22/2010	
Horry Telephone Cooperative, Inc.	Backhaul	No Update to Provide	1/22/2010	
NTInet, Inc	Fixed Wireless	No Update to Provide	2/9/2010	
Palmetto Rural Telephone Cooperative, Inc.	DSL	No Update to Provide	1/22/2010	
Palmetto Rural Telephone Cooperative, Inc.	DSL	No Update to Provide	1/22/2010	
Pee Dee Online Consulting	Fixed Wireless	No Update to Provide	2/24/2010	
Piedmont Rural Telephone Cooperative, Inc.	DSL	No Update to Provide	1/28/2010	
Piedmont Rural Telephone Cooperative, Inc.	Mobile Wireless	No Update to Provide	1/28/2010	
Rock Hill Telephone Company	Backhaul	No Update to Provide	1/25/2010	
Rock Hill Telephone Company	Backhaul	No Update to Provide	1/25/2010	
Rock Hill Telephone Company	Backhaul	No Update to Provide	1/25/2010	
Rock Hill Telephone Company	Cable	No Update to Provide	1/25/2010	
Rock Hill Telephone Company	Cable	No Update to Provide	1/25/2010	
Rock Hill Telephone Company	Cable	No Update to Provide	1/25/2010	
Rock Hill Telephone Company	Cable	No Update to Provide	1/25/2010	
Rock Hill Telephone Company	DSL	No Update to Provide	1/25/2010	
Rock Hill Telephone Company	DSL	No Update to Provide	1/25/2010	
Rock Hill Telephone Company	DSL	No Update to Provide	1/25/2010	
Rock Hill Telephone Company	DSL	No Update to Provide	1/25/2010	
Rock Hill Telephone Company	Fiber	No Update to Provide	1/25/2010	
Rock Hill Telephone Company	Fiber	No Update to Provide	1/25/2010	
Rock Hill Telephone Company	Fiber	No Update to Provide	1/25/2010	
Rock Hill Telephone Company	Fiber	No Update to Provide	1/25/2010	
Rock Hill Telephone Company	Fixed Wireless	No Update to Provide	1/25/2010	
Rock Hill Telephone Company	Mobile Wireless	No Update to Provide	1/25/2010	
Sandhill Telephone Coop., Inc.	Backhaul	No Update to Provide	1/25/2010	
Sandhill Telephone Coop., Inc.	DSL	No Update to Provide	1/25/2010	
Skyrunner, Inc.	Fixed Wireless	No Update to Provide		
Southern Coastal Cable, LLC	Cable	No Update to Provide	6/30/2010	
Spacenet, Inc.	Satellite	No Update to Provide		

Sprint Nextel Corporation	Backhaul	No Update to Provide	1/14/2010	
TDS Telecommunications Corporation	Backhaul	No Update to Provide	1/27/2010	
tw telecom of south carolina, llc	Backhaul	No Update to Provide	4/26/2010	
United States Cellular Corporation	Mobile Wireless	No Update to Provide	2/15/2011	
ViaSat, Inc.	Satellite	No Update to Provide	1/8/2010	
West Carolina Rural Telephone Cooperative, Inc.	Backhaul	No Update to Provide	1/22/2010	
WideOpenWest Finance, LLC	Cable	No Update to Provide		[MAR-07-13 Matthew Brunt] Change: WideOpenWest Finance, LLC acquired Knology; they are now a broadband provider for the state.
ATG Communications, LLC	Backhaul	No Update Provided – Use Last Submission Data	1/14/2010	
Chester Telephone Company	Backhaul	No Update Provided – Use Last Submission Data	1/25/2010	
Chester Telephone Company	DSL	No Update Provided – Use Last Submission Data	1/25/2010	
Chester Telephone Company	Fiber	No Update Provided – Use Last Submission Data	1/25/2010	
Chester Telephone Company	Cable	No Update Provided – Use Last Submission Data	1/25/2010	
Windstream Communications	Backhaul	No Update Provided – Use Last Submission Data	1/20/2010	
Windstream Communications	Backhaul	Solicited Initial Data	1/20/2010	
Atlantic Tele-Network, Inc.	Mobile Wireless	Non-Responsive to Multiple Attempts		In addition to multiple contact attempts made during previous mapping submission periods, 5 contact attempts were made this period.

South Dakota Broadband Mapping Project: Product Release White Paper

Contact Name Manager:	Jim Edman
Contact Phone Number:	603-773-4861
Contact E-mail:	**Jim.Edman@state.sd.us**
Submitted By:	Kristin Rousseau
Contact E-mail:	**kristin.rousseau@broadmap.com**

Product Specification:	Spring 2013 NTIA Data Model
Product/Process:	NTIA—April 1, 2013 Data Deliverable
Dataset Submission QC:	NTIA—SBDD_CheckSubmission.py

Table of Contents

OVERVIEW

This white paper highlights the **Submission Summary** for this deliverable, as well as describes the **Data Gathering**, **Data Integration**, **Data Validation and Verification** and **Quality Control** processes used to create the Broadband Mapping Project's April 1st, 2013 data submission. To support varying levels of technical and program knowledge, both a **high-level summary** and a **detailed process review** are supplied.

SUBMISSION SUMMARY

PROVIDER DETAILS

PROVIDER PARTICIPATION

- Provider Participation Statistics Summary

Summary	Count
Total Providers Researched/Contacted	101
Total Valid Broadband Providers	54
Non-Responsive Providers	4
Non-Cooperative Providers	1
Number of Providers - Supplied Updates for this Submission	36
Number of Providers - Confirmed No Updates	5

- New Providers Since Last Data Submission
  - Native American Telecom
  - Additional new providers have been identified, which we're currently working with for future representation on the broadband map. They are as follows:
    - Evertek
    - Sandhills Wireless
    - Timber Lake Broadband

- Existing Providers – Confirmed No Updates
  - Mediacom Communications Corporation
  - Northern Valley Communications
  - Skycasters
  - StarBand Communications Inc.
  - ViaSat, Inc.

- Non-Responsive Providers/Non-Cooperative Providers
  - KeyOn Communications Inc.
  - New Edge Network, Inc.
  - Western Communications
  - Wirefree USA
  - Nate's Net

- Providers researched and identified as non-broadband providers can be viewed within the table at the end of this document.

COMMUNITY ANCHOR INSTITUTION (CAI) DETAILS

OVERALL STATISTICS

Community Anchor Institution - Categories	Overall Count	CAIID Counts	Broadband Subscriber (Yes)	Trans Tech	Advertised Speed Down	Advertised Speed Up
Category 1 - School K through 12	548	229	474	323	238	238
Category 2 - Library	121	99	35	29	24	24
Category 3 - Medical/Healthcare	210	0	123	39	33	33
Category 4 - Public Safety	473	0	86	61	24	24
Category 5 - Universities/Colleges	58	29	56	40	12	12
Category 6 - Other: Government	599	1	598	598	165	165
Category 7 - Other: Non-Government	26	0	13	12	9	9
Total	**2035**	**358**	**1385**	**1102**	**505**	**505**

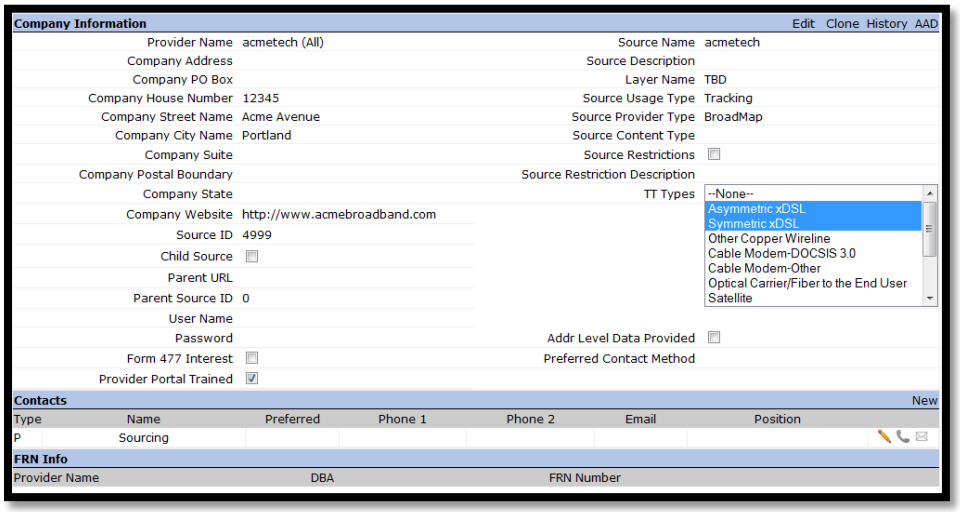
HIGH-LEVEL SUMMARY

DATA GATHERING

BROADBAND SERVICE AREAS, MIDDLE MILE AGGREGATION POINTS AND BROADBAND SERVICE OVERVIEW

The collection of Broadband Service Areas, Middle Mile Aggregation Points and Broadband Service Overview information is handled through the following Provider Outreach Process:

- Build and maintain an inventory of Broadband providers through currently known providers and research.
- The inventory and everyday interaction with providers is tracked using the Provider Catalog (PCat). Below are some examples of the web application, which has a shared access between our team and mapping partner (BroadMap).



Company Information — Edit Clone History AAD

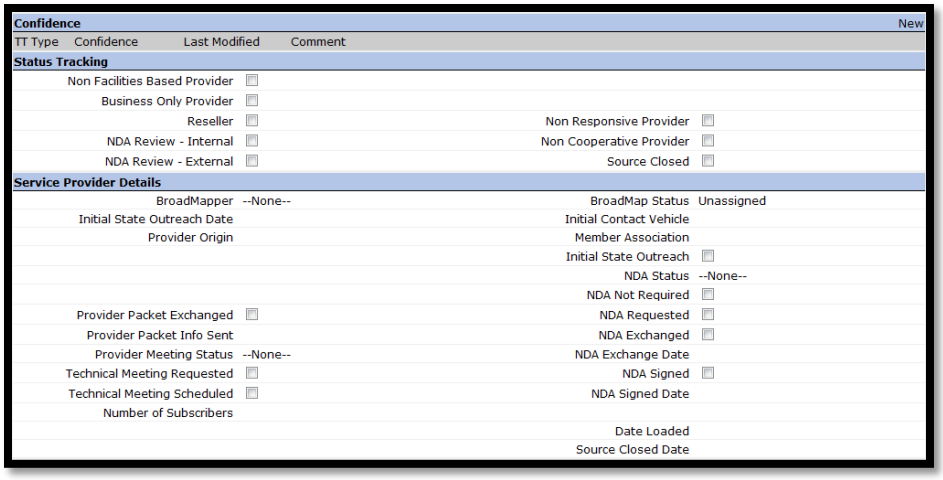
Provider Name	acmetech (All)	Source Name	acmetech
Company Address		Source Description	
Company PO Box		Layer Name	TBD
Company House Number	12345	Source Usage Type	Tracking
Company Street Name	Acme Avenue	Source Provider Type	BroadMap
Company City Name	Portland	Source Content Type	
Company Suite		Source Restrictions	☐
Company Postal Boundary		Source Restriction Description	
Company State		TT Types	--None--
Company Website	http://www.acmebroadband.com		Asymmetric xDSL
Source ID	4999		Symmetric xDSL
Child Source	☐		Other Copper Wireline
Parent URL			Cable Modem-DOCSIS 3.0
Parent Source ID	0		Cable Modem-Other
User Name			Optical Carrier/Fiber to the End User
Password			Satellite
Form 477 Interest	☐	Addr Level Data Provided	☐
Provider Portal Trained	☑	Preferred Contact Method	

Contacts — New

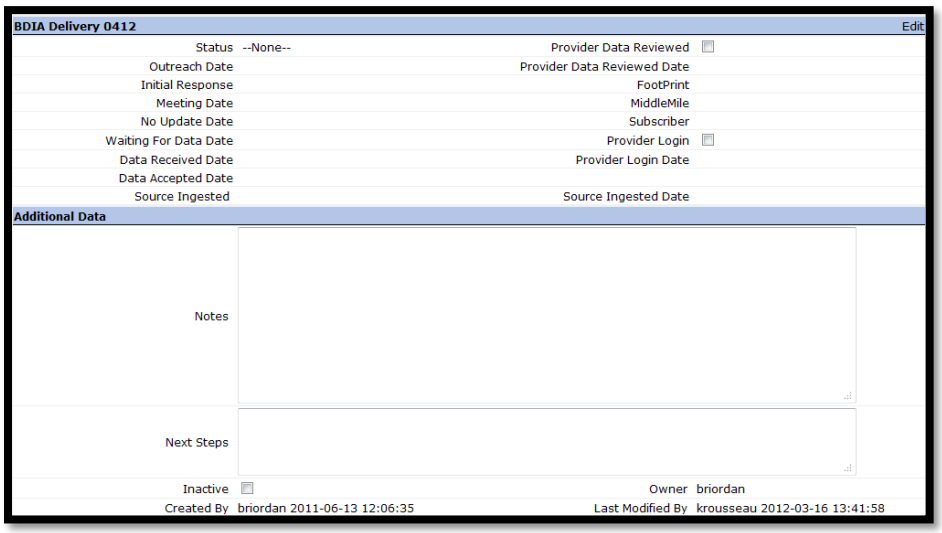
Type	Name	Preferred	Phone 1	Phone 2	Email	Position
P	Sourcing					

FRN Info

Provider Name	DBA	FRN Number



Confidence				New
TT Type	Confidence	Last Modified	Comment	
Status Tracking				
Non Facilities Based Provider	☐			
Business Only Provider	☐			
Reseller	☐		Non Responsive Provider	☐
NDA Review - Internal	☐		Non Cooperative Provider	☐
NDA Review - External	☐		Source Closed	☐
Service Provider Details				
BroadMapper	--None--		BroadMap Status	Unassigned
Initial State Outreach Date			Initial Contact Vehicle	
Provider Origin			Member Association	
			Initial State Outreach	☐
			NDA Status	--None--
			NDA Not Required	☐
Provider Packet Exchanged	☐		NDA Requested	☐
Provider Packet Info Sent			NDA Exchanged	☐
Provider Meeting Status	--None--		NDA Exchange Date	
Technical Meeting Requested	☐		NDA Signed	☐
Technical Meeting Scheduled	☐		NDA Signed Date	
Number of Subscribers				
			Date Loaded	
			Source Closed Date	



BDIA Delivery 0412				Edit
Status	--None--		Provider Data Reviewed	☐
Outreach Date			Provider Data Reviewed Date	
Initial Response			FootPrint	
Meeting Date			MiddleMile	
No Update Date			Subscriber	
Waiting For Data Date			Provider Login	☐
Data Received Date			Provider Login Date	
Data Accepted Date				
Source Ingested			Source Ingested Date	
Additional Data				
Notes				
Next Steps				
Inactive	☐		Owner	briordan
Created By	briordan 2011-06-13 12:06:35		Last Modified By	krousseau 2012-03-16 13:41:58

- Update provider material that describes the data requirements and logistics for data transfer.
- Update Non-Disclosure Agreement (NDA) for use in the project, where applicable.
- Maintain multiple protocols for the provider to submit data, including Secure File Transfer Protocol (SFTP) technology when desired.
- Conduct one-on-one informational discussions with each provider to communicate the following:
    - Requirements of this project;
    - Broadband data required to support the product data model;
    - Submission protocols available;
    - Capability to validate how the supplied data is aggregated.
- Download/receive provider data.
- Establish a repeatable process with provider. Maintain provider communication, transaction and data handling records throughout the project (dates contacted, data received, etc.).

COMMUNITY ANCHOR INSTITUTION (CAI)

The collection of CAI information is handled through the following CAI Collection Process:

- Collect and maintain inventory of CAIs through currently known CAIs, data mining, and research.
- Maintain web-based CAI portal for institutions to add or confirm attribution, location and enter broadband-specific information.
- Upload web-based data to Core Database for standardization.
- Perform internal cleansing, such as removing duplicate records, identifying gaps in broadband attribution and verifying category.
- Geocode CAI locations.
- Translate Core Database data to deliverable-ready format.
- Continue engagement with non-responsive institutions.

DATA INTEGRATION PROCESS

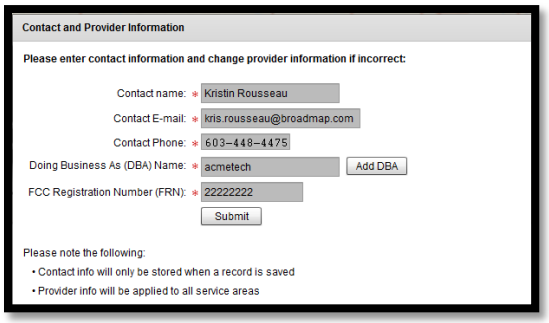
The data integration and processing mechanisms currently used allows for multiple types of inputs and result in a standardized output that meets the NTIA deliverable requirements. This flexible process supports data model changes and project-requested enhancements.

- Receive inputs from providers via submission protocols; upload into Sourcing Database and catalog with provider information.
- Review provider-supplied data for completeness and for potential discrepancies that require resolution prior to processing and flag as necessary.
- Categorize input into data-type category (addresses, block lists, paper maps, etc.).
- Standardize input based on data type within Staging Database.
- Create Compact Polygons (CP)—(internal methodology for generating area-based feature for coverage in Staging Database).
- Apply broadband attribution to CP; apply metadata to CP.
- Perform quality analysis of the CP against the source supplied to identify any completeness or accuracy issues.
- Request additional information from the provider if elements of coverage are missing or contain discrepancies. This is a second manual quality check to ensure data is complete.
    - Process coverage area to build the required NTIA data model layers.

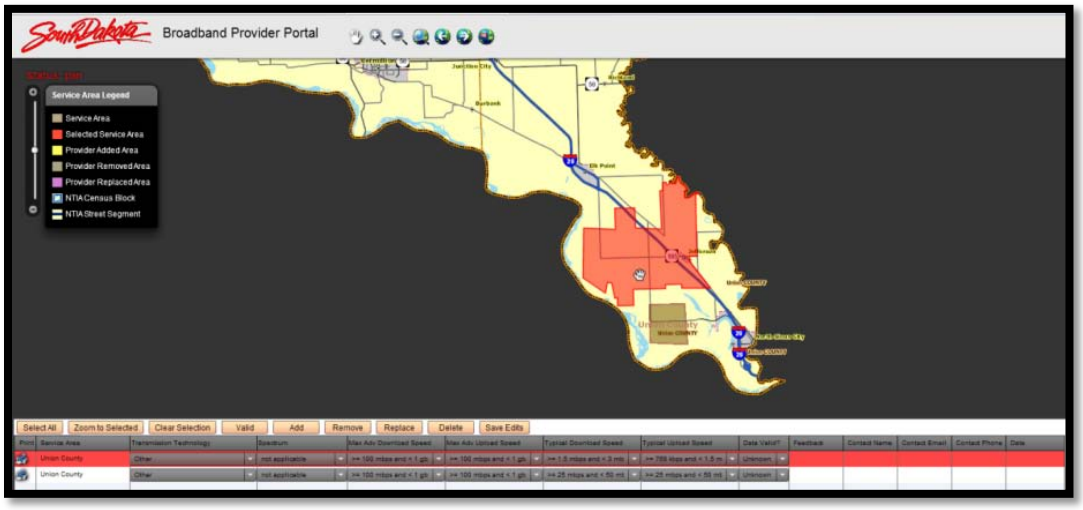
With the deployment of the Provider Portal this round, the data collection and later validation process was streamlined allowing both activities to occur within a secure web application. The majority of the providers used this methodology as it supplies them with more visibility into how their data is being represented and gives them knowledge and ownership of their coverage representation. Below are some bullet points and supporting screen shots on how the portal is used.

- Each provider is assigned credentials with a strong password to ensure security measures are taken into consideration

- Collection and confirmation our contact, as well as the company's DBA Name and FRN accuracy

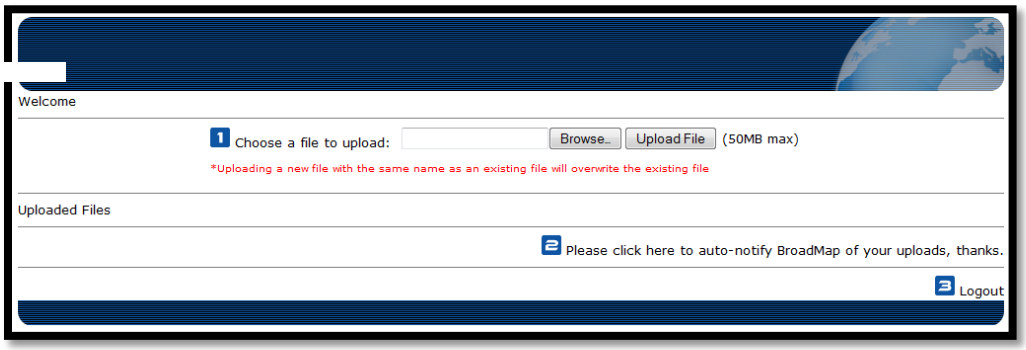


- Capability to review and request changes to the coverage footprint



- The provider can Add/Remove portions, or all, of the footprint requesting that their footprint be increased or refined.

- File upload functionality to support providers that would prefer a shapefile, spreadsheet, PDF, KMZ/KML file be used to reflect changes for the data round



- Once the provider has reviewed completed changes to their coverage, they can then validate them by signing off that everything is accurate.

DATA VALIDATION AND VERIFICATION

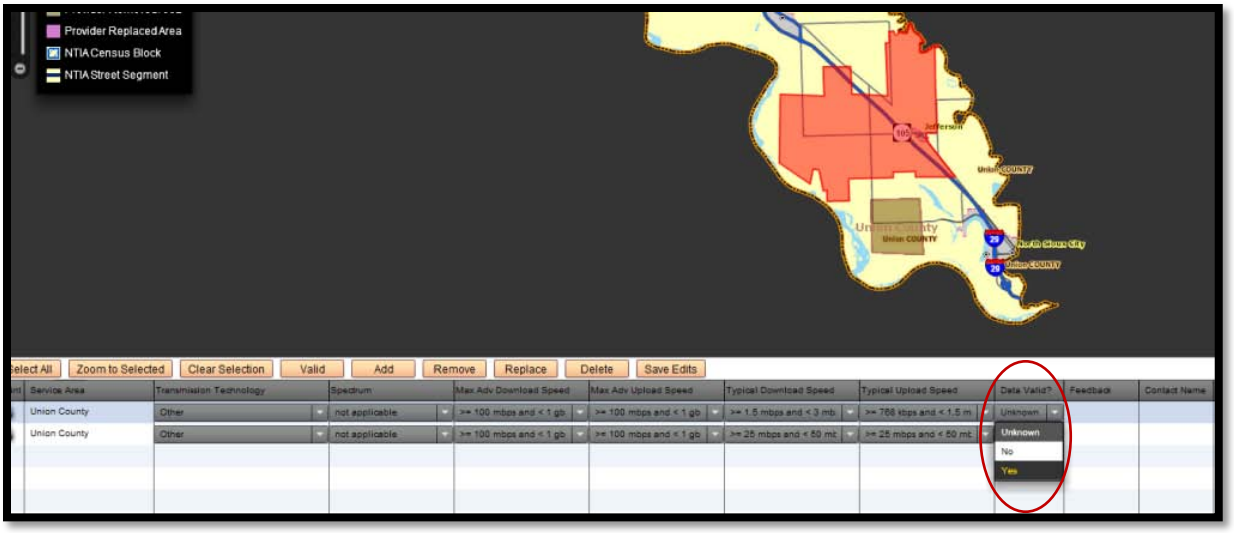
To ensure the data collected and processed is as accurate and as comprehensive as possible, South Dakota broadband verification encompasses many efforts. The methodologies employed are documented below:

BROADBAND PROVIDER VALIDATION—PROVIDER PORTAL APPLICATION

First and foremost, all providers are given access to, and are trained in the use of, a web application we call the "provider portal". After each data collection and ingestion of provider data, representatives from the provider are able to review the polygons, segments, speeds, technologies, and other attribution that our GIS teams have developed based on the submitted data. Providers are given the opportunity to make changes to the data's attributes (speeds, technology, spectrum, etc…) as well as add/change/move/delete coverage areas. The requested changes are delivered to the GIS teams for full ingestion in our broadband database. This process is repeated until the provider representatives confirm that all aspects of the coverage areas are accurate and complete.

This portal is available 24/7/365 for providers to utilize, allowing those companies without GIS or mapping staff access to those technologies and benefits for review, presentations, and other business opportunities. This process has proven both successful and popular in the provider community.

- Coverage validation can be done on one record/footprint at a time or by selecting footprints and selecting the 'Valid' button. The provider could also print off or download their coverage for their own tracking purposes.



All validation results are tracked internally through our Validation Table, which also improves the overall **Confidence Value** as mentioned below.

FURTHER BROADBAND PROVIDER VALIDATION

Following the completion of each data submission, maps are supplied to each provider in PDF format for them to perform further validation and review with their staff. These maps are also utilized as marketing material for their websites, internal communications, etc., which further fosters participation.

Any feedback or changes received following the delivery of these maps are incorporated into the overall broadband map and reviewed again with the provider.

RF PROPAGATION – PREDICTIVE MODELING

For this data submission, we have used EDX to perform RF propagation analysis and create predictive modeling of wireless coverage based on available tower data. The analysis performed thus far has not required us to make significant adjustments to the provider submitted shapefiles; however we are working with providers to collect further tower information, as well as potential extra signal strength that may be gained from repeaters.

We are also offering these maps created to providers as a service, so they can use it to further validate the coverage area and use it for marketing material. This will help ensure continuous participation in the program.

INDUSTRY KNOWLEDGE – SUBJECT MATTER EXPERTS

South Dakota's technology and telecommunications businesses are highly consolidated, with the State of South Dakota often being the largest consumer of services in the state. Given that, relationships and partnerships often already exist between the State of South Dakota and the broadband providers, giving a first-hand look at the services offered and where they are offered. In addition, the South Dakota broadband team has ready access to industry experts within the SD Public Utilities Commission, telecommunications association's boards, and technology industry experts in the fields of telecommunications and data networking.

Our office has met and consulted with these experts regarding provider data as issues were found. Examples of these consultations are the review of provider coverage areas against telecommunications exchange areas with the Public Utilities Commission and against known technological capabilities. Any anomalies or questioned material is relayed to the providers for review.

FIELD VERIFICATION

A number of field verification efforts have taken place during the last six months.

- For newly discovered fixed wireless providers, we send remote office staff out to document and photograph the tower infrastructure reported by the provider.

- For mobile wireless providers, broadband staff and other team members have completed over 40,000 miles of drive testing utilizing mobile wireless phones collecting information on coverage and broadband performance. This drive testing has collected over 1.86 million data points across the state that confirm the availability of wireless broadband signal at a geographic location by coordinates, with the data collected every 10 seconds during the drive testing. Tower location information and wireless speed test results were also collected during this drive testing, with over 25,000 test results collected. This gives us a total of 270,000 speed test results with the information collected during our field verification efforts and the Ookla mobile data.

- One verification effort that has picked up steam recently has been crowdsourced reporting of unserved areas. Our website has always maintained a feature for the public to report unserved areas, but participation hasn't been as strong as previously hoped. Our office has recently seen an increase in the usage of this reporting tool. We compare these reports to our data, with follow-ups as necessary to both the provider and the reporting citizen.

An important point to note is that with the development of an automated toolset that allows team members to start data collection upon entering the vehicle and not need any further intervention, a number of staff members have been volunteering time to drive untested roads and territories of the state during vacations, other state business, or leisure time at no cost to the program.

Due to the nature of our organization being a centralized IT group for government and education, we are uniquely positioned to request field verification by our remote office staff. As technicians travel the state, they have performed speed tests at businesses, homes, and government offices, as well as surveyed remote office staff on availability of coverage areas at their homes.

THIRD-PARTY DATA VERIFICATION

The South Dakota broadband team has collected data from the FCC CBT and Mobile tests, the FCC dead zone reporting tool, FCC ASR datasets, our own hosted speed test application, provider speed test results, census data, provider exchange boundaries and commercially available datasets from Ookla to confirm the availability of broadband service. Of particular interest to our program were datasets that tied a specific address to the broadband data, as we have found other location-based services (IP geolocation) to be woefully inaccurate in our state.

Collected third-party data is overlaid against provider coverage areas for comparison. Most valuable has been our hosted speed test server (speedtest.sd.gov). This test collects specific address location information and provider details, while providing consumers the ability to directly provide more accurate location information via a clickable map in the event that their address is not geocoded correctly. This provides benefits to our verification effort as well as our Improved Address Files grant program.

Recently added to our verification efforts have been more accurate provider exchange boundaries and 2010 Census information on population density. Provider coverage areas are compared against known exchange boundaries, and census population density information is used to explain any possibly gaps in coverage.

CROWD SOURCING

In addition to our Crowd sourced speed test system, our state broadband website offers consumers the ability to report broadband dead zones, take surveys on available broadband and related topics, report inaccuracies in our online static/interactive maps, as well as any other relevant feedback about the broadband environment of South Dakota. This feedback is compared against provider coverage areas, with relevant information reported to the providers for comments and/or correction.

Website Hyperlink: **http://broadband.sd.gov/**

CONFIDENCE VALUES

All verification, validation and manual quality review results are tracked by provider/technology type and stored and maintained within a **Validation table**. A confidence value is assigned, based on internal assessments of the collected information, to highlight the provider coverage areas and/or attributions that would benefit from further investigation and/or enhancements.

With the continued efforts on provider validation, 3rd party verification and the release of the public interactive map with feedback collection functionality, the confidence values will be utilized further to identify specific areas in need of attention.

QUALITY CONTROL

Following collection, processing and analysis of the provider and CAI data, the product is checked manually and algorithmically against the NTIA data model. Some of the items included within these checks are:

- Format correctness;
- Table and field structure;
- Valid values, including default values, where applicable;
- Geographic extent and topology errors.

Prior to data submission, another quality control script supplied by NTIA is run. This script, SBDD_CheckSubmission.py, creates an output in text form that is required to be submitted along with the final deliverable. All errors must come up clean, unless otherwise specified by NTIA.

DETAILED PROCESS REVIEW

To review the detailed process, please review the attached object:

BMap_ProcessDetails_2013_04_01.docx

PROVIDERS RESEARCHED

Below is a list of providers that were researched and contacted, but identified as non-broadband providers and didn't require inclusion within the data submission. Some may be due to different naming conventions or inaccurate FRN/DBA names and were therefore considered a closed source.

5LINX Enterprises, Inc.
Airespring, Inc.
Apptix, Inc.
Aptela, Inc.
Bandwidth.com, Inc.
Birch Communications Inc.
Broadvox Go!, LLC
BullsEye Telecom, Inc.
Cause Based Commerce Inc.
CommPartners Holding Corporation
Dickey Rural Telephone Cooperative
DigitalBridge Communications Corp.
Evertek, Inc.
Farmers Mutual Telephone Company (MN & SD)

Matrix Telecom, inc.
Megapath, Inc.
Metropolitan Telecommunications Holding Company
Millicorp
Minnesota Valley Television Improvement Corporation
Mitel Netsolutions Inc.
MobilePro Corp.
Nates Net
Native American Telecom
NextWave Wireless Inc.
nexVortex, Inc.
Northeast Nebraska Telephone Company
NOS Communications, Inc.
OrbitCom, Inc

Fionda VoIP, LLC	PaeTec Corporation
Granite Telecommunications, LLC	Phone.com, LLC
Great Plains Communications, Inc.	Proximiti Technologies, Inc.
GreatCall, Inc.	Siouxland WISP
Hickory Tech Corporation	Timber Lake Broadband
iCore Networks, Inc.	Trans National Communications International, Inc.
InPhonex.com, LLC	tw telecom inc.
Kosmaz Technologies, LLC	VoIP360, Inc.
Level 3 Communications, LLC	VoIPStreet, Inc.
Local Link	Vonage Holdings Corp.
LY Holdings, LLC	Wave2Wave Communications, Inc.

OFFICIAL APRIL 2013 UPDATE SUBMISSION TO THE NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION UNDER THE STATE BROADBAND INITIATIVE GRANT PROGRAM FOR THE STATE OF TENNESSEE

April 1, 2013

TABLE OF CONTENTS

April 1, 2013

Ms. Anne W. Neville
SBI Grant Program Director
National Telecommunications and Information Administration
U.S. Department of Commerce
Room 4716
1401 Constitution Avenue, NW
Washington, DC 20230

Dear Ms. Neville:

As the State Broadband Designated Entity, Connected Tennessee, in partnership with the Department of Finance and Administration's Office for Information Resources, the Department of Economic and Community Development and other agencies, please accept this submission from Connected Tennessee on behalf of the State of Tennessee's State Broadband Initiative (SBI) Grant Program.

Connected Nation and Connected Tennessee congratulate the National Telecommunications and Information Administration (NTIA) and the Federal Communications Commission (FCC) on achieving the two-year anniversary of the National Broadband Map. Truly, now more than ever, the significance of complete and validated data through this effort is impacting lives in communities all across our great country. The Connected Tennessee program and its collective stakeholder community continue to be faithful and energized contributors, and we are proud to play such a part in forging the innovation economy of the twenty-first century.

The artifacts that comprise this submission should be found to be compliant with the April 1, 2013, deadline for the semi-annual data update and in accordance with the terms of the July 1, 2009, Notice of Funds Availability (NOFA) and all subsequent clarifications pertaining to delivery of state-level mapping of broadband service availability. This packet includes:

Inventory of Deliverables, Connected Tennessee: April 1, 2013

NOFA Requirement	Data Transfer Model	Data Description
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in Census Blocks of No Greater Than Two Square Miles in Area

Appendix A: 1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census Blocks Larger in Area Than Two Square Miles
Appendix A: 1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address
Appendix A: 3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points
Appendix A: 4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing
Appendix A: 4	n/a	Community Anchor Institutions-Narratives
VII.A.1(a)	n/a	Accuracy and Verification Report
n/a	DataPackage.xlsx	Worksheets of Contact Information, Record Count, and Provider Summary Table
n/a	n/a	List of Changes and Corrections to the Dataset
n/a	n/a	Non-Participating Provider (NPP) Narratives
n/a	n/a	Broadband Provider Roster and Participation Status

In addition, this data update submission should be found to be compliant with the additional program requirements instituted by the National Telecommunications and Information Administration since the time of the October 2012 SBI data submission for the Connected Tennessee program. Specifically, these new requirements are:

SBI Data Transfer Model

The submission of the broadband dataset for April 1, 2013, is contained within the SBI Data Transfer Model as released on the Grantee Workspace on December 14, 2012. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information on each provider as possible.

Additional Submission Guidance

On February 8, 2013, NTIA released new guidance regarding the processing of wireless data, for both fixed and mobile broadband providers. All wireless provider coverage records have been reviewed and are in compliance with this grantee guidance for this April 2013 submission period. Even providers that did not have an update for this submission cycle were reviewed and data reprocessed as necessary for those records that were not yet in compliance with the new guidance.

This submission continues to follow the speed technology guidance released by the Program Office on August 9, 2012, to review speed tier codes in correspondence with technology of transmission codes. In the October 2012 submission, descriptions were provided in the methodology paper that offered an explanation for any submitted technology of transmission and speed combinations that were outside of the expected value range. That practice continues in this submission as technology and speed combinations are reviewed and scrutinized; any questionable information supplied by providers is reviewed more in depth with the provider to ensure the information is accurately captured or a proper explanation is provided as to why the speed information should be submitted as supplied even if it falls outside the expected value range.

This submission also includes narratives describing the data and coverage estimation of non-participating providers. While Connected Tennessee continues outreach to all providers prior to each submission period, the need to submit broadband service data for all providers regardless of their participation is evident as the SBI program continues into this seventh round of data submissions. The submission of this estimated broadband service area for providers that have not supplied data to Connected Tennessee is essential in being able to portray a more accurate depiction of the current broadband landscape.

This April 2013 semi-annual data update under the SBI Grant Program continues to demonstrate our dedication to implementing the joint purposes of the Recovery Act and the Broadband Data Improvement Act (BDIA) by gathering comprehensive and accurate state-level broadband mapping data, developing state-level broadband maps, aiding in the development and maintenance of the National Broadband Map, and undertaking statewide initiatives for broadband planning.

Broadband Service Availability — Provider Outreach and Verification

This data update submission under the SBI program includes datasets for 97.67 percent of the Tennessee provider community, or 84 of 86 total providers. There are 82 participating providers and 2 additional non-participating providers whose estimated coverage areas have been submitted. Of the 82 participating providers, 38 supplied an update to their network or coverage area(s), while 26 have reported no change. The remaining 18 represent providers who previously supplied data but were non-responsive in the April 2013 update effort; therefore, their previous dataset is being put forward as part of this compilation. A complete roster by provider depicting participation status and contact history is contained herein. The 2 remaining providers that are not represented in the attached datasets have refused to participate in the voluntary program or were non-responsive to multiple contact attempts.

As the aforementioned roster and attached methodology documentation will attest, it is the collective opinion of the Connected Tennessee principals that all commercially reasonable efforts were made to account for 100 percent of the known Tennessee broadband provider community, pursuant to this semi-annual data update submission.

Connected Tennessee has also continued to perform broadband verification activities through several means. In addition to confirmation of service area(s) by each provider, Connected Tennessee conducts field validation efforts. To date, 61 (70.93 percent) providers have been

validated through field verification activities. Additional details on verification activities are contained within the Field Validation Methodology.

The Connected Tennessee website, (www.connectedtennessee.org) continues to serve a prominent role in the outreach and data collection effort. This program asset provides a way for the general public to participate in the process by offering interactive tools for users to test their connection speed, submit broadband inquiries, or contact a program representative.

As an indicator of stakeholder penetration, the Connected Tennessee website encountered 5,006 unique visits during this reporting period (49,297 total to date for the life of the grant awarded on December 20, 2009. Additionally, this pronounced Web activity netted 41 broadband inquiries over this same reporting period (1,569 grant inception to date). The website also provides access to the My ConnectView™ interactive mapping application, which allows consumers and broadband providers to confirm or dispute the coverage represented on the broadband inventory map. These consumer-initiated actions are facilitated through the Connected Tennessee website and the Connected Tennessee interactive mapping tool (My ConnectView™) that offer the stakeholders the vehicles to provide information regarding availability in their respective service area, either in affirmation or contest of the reported data represented in the Connected Tennessee mapping artifacts. Since the initial data collection and release of corresponding maps, feedback in the form of broadband inquiries has allowed Connected Tennessee to identify additional areas that are in need of field validation, which is scheduled as soon as possible.

Community Anchor Institutions

Connected Tennessee continues to make significant inroads to gather data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. This uptick in CAI data collection was further supported by NTIA's outreach to grantees reiterating the importance of this outreach. We have continued to focus on a relationship-oriented approach with state-level agencies and organizations that generates more responses than general contact.

Outreach was conducted during this data update reporting period by Connected Tennessee to continue identification of existing, centralized sources for CAI connectivity data. Additionally, outreach was coordinated to distribute the CAI survey to institutions throughout the state through multiple methods including a customized online survey available on the Connected Tennessee website. Building on past success of the September 2012 Education Campaign, February 2013 was recognized as Public Safety Month where the public safety sector was the focus of CAI data collection, research, and public affairs outreach. Connected Tennessee has developed a number of new relationships with statewide associations, such as the Department of Safety & Homeland Security and the Tennessee Hospital Association, to promote the importance of broadband connectivity at anchor institutions and participation in this data collection process. The value of these relationships continues to impact the entire success of the Grant Program, and the CAI engagement is a logical extension of new and existing relationships. Connected Tennessee will continue to build upon these new relationships over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

From our work in Tennessee, as well as other states, we recognize the great value of this data to future collaboration efforts within the state as well as its value to the National Broadband Map. We plan to continue to bring best practices to the Connected Tennessee efforts, along with an investment of both human and technical resources required to reach our goal of increasing the data that is secured and reported as part of this process.

The Connected Tennessee program exists to improve data on the deployment and adoption of broadband services and to assist in the extension of broadband technology across all regions of the great State of Tennessee, as well as the United States and its territories through contribution to the National Broadband Map. We look forward to the continuing work ahead and improving upon our data collection methods.

Respectfully submitted,

Corey Johns
Executive Director
Connected Tennessee

TENNESSEE COMMUNITY ANCHOR INSTITUTIONS METHODOLOGY

In this seventh reporting period of the SBI, Connected Tennessee, working in close coordination with the state of Tennessee, has established an ongoing mechanism for gathering data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. Since the October 2012 data submission, the CAI outreach process method has been modified to improve data collection. Specifically, the outreach process is a more focused sector-specific and relationship-oriented approach that generates more responses than general contact.

Connected Tennessee has continued to identify and process CAI data obtained through an ongoing statewide outreach campaign. Physical address information continues to be augmented through manual sourcing and geocoded by Connected Tennessee through Esri ArcGIS software.

Connected Tennessee continues to utilize a customized online survey hosted through SurveyMonkey, with a landing page on the Connected Tennessee website that was developed during the first reporting period. This survey, in combination with a customized data-gathering spreadsheet, was distributed on a regular basis to a targeted list of CAI throughout the state as well as organizations and agencies that work closely with the CAI. The distributions were completed with the support of the state client. Connected Tennessee will continue to use these data-gathering tools for future targeted outreach efforts throughout the coming months leading up to the next reporting period. These materials are customized to fit the CAI categories as defined in the SBI NOFA.

The survey can be accessed at this link: http://www.surveymonkey.com/s/RJK59FP.

In addition to the survey, Connected Tennessee has developed a number of new relationships with statewide associations, such as the Department of Safety and Homeland Security and the Tennessee Hospital Association, to promote the importance of broadband connectivity at Community Anchor Institutions and participation in this data collection process. It is apparent that these relationships are beneficial to the entire success of the grant program, and the CAI engagement is a logical extension of new and existing relationships. Connected Tennessee will continue to build upon these new relationships over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

In addition to fostering and building relationships with state agencies, associations, and organizations, Connected Tennessee has also developed a sector-specific calendar that supports CAI outreach as well as research and communications efforts. This focused approach allows a corporate commitment to capturing CAI data in addition to developing meaningful sector-specific content. Since the October 2012 submission, the sector-specific approach included a month-long public safety campaign in February 2013. During this campaign, Connected Tennessee committed to improve relationships with key stakeholders, distribute survey requests to sector representatives, and provide sector-specific education through communications and webinar resources. Outreach to and survey of hospitals, local law enforcement, and fire stations helps build awareness and establishes a centralized database of key connectivity data for planning.

Connected Tennessee conducts significant research as part of an ongoing process to identify existing, centralized sources for CAI connectivity data. In tandem with these efforts to identify existing data, Connected Tennessee continues to identify key CAI contacts in an effort to distribute and promote the online survey and raise awareness of the importance of CAI broadband connectivity. Also, when possible, Connected Tennessee works with the Department of Finance and Administration's Office for Information Resources and the Department of Economic and Community Development to identify existing relationships that can support CAI outreach.

Connected Tennessee has an ongoing mission to educate CAI throughout the state on the importance of participating in the project. Participation by these institutions will raise awareness about the importance of broadband connectivity and the need to report the requested data for inclusion on the National Broadband Map.

The greatest challenge with collecting CAI data continues to be educating the CAI about the Connected Tennessee project as well as self-awareness of their own broadband connectivity (specifically upload and download speeds). Connected Tennessee will continue to research key CAI organizations and agency contacts in an effort to raise awareness of this project among CAI. When applicable, the Department of Finance and Administration's Office for Information Resources and the Department of Economic and Community Development will continue to be briefed on the current CAI data and provided information so it can assist with outreach and promotion within the state.

A CAI summary of all processed and submitted data is provided below:

CAI Type	Total	Physical Address	Lat/Long	Technology of Transmission	Download Speed	Upload Speed
K-12 Schools	2330	2330	2327	1145	1145	1143
Libraries	315	315	315	223	223	223
Healthcare	923	923	918	220	219	219
Public Safety	763	763	757	148	126	126
Higher Ed Institutions	409	409	407	175	178	123
Other Government	1200	1200	1192	1121	1106	1106
Other Non-Government	224	224	219	132	129	129
Total	6164	6164	6135	3164	3126	3069

During the coming months, CAI data collection will be supported by regular reporting to the Connected Tennessee team. The CAI data is proving an invaluable resource to all components of the Connected Tennessee effort. The data identifies potential local champions, sector trends, and opportunities for improvement as well as opportunities to educate CAI not familiar with their current connectivity.

SBI Data Submission Methodology

The submission of the broadband dataset for April 1, 2013, is contained within the SBI Data Transfer Model and additional components as released on the Grantee Workspace on December 14, 2012. Connected Nation (CN) has reviewed all literature that relates to the release and use of this data transfer model and recognizes that it does not replace or dictate how data is stored, processed, or displayed for the state, as it is meant primarily as a means to transfer the broadband data from all states and territories and populate the National Broadband Map in a seamless fashion.
Connected Nation has complied with the following guidance documents published by NTIA:

- Technical Mapping Guide, as released on the Grantee Workspace on March 24, 2011, was followed to ensure the completeness and validity of the submission through completion steps and checklists, completing the DataPackage spreadsheet, uploading broadband datasets into the Data Transfer Model, and checking the dataset using the SBDD_CheckSubmission receipt process.
- Naming Conventions and Category of End User, as released on the Grantee Workspace on March 26, 2012, was followed to ensure the consistency of individual file and zip package naming.
- Wireless Data Processing Guidance, as sent to SBI grantees on February 8, 2013, was followed to ensure that all fixed and mobile wireless provider coverage records are submitted to NTIA as separate, closed polygons whenever there is a variation in any of the required fields.

In addition to the methodologies contained herein, the Changes and Corrections documentation, as well as the DataPackage.xls containing contact information, the data dictionary, and a provider summary table, the following feature classes are submitted within the SBI Data Transfer Model for the State of Tennessee.

Inventory of Deliverables, Connected Tennessee: April 1, 2013

NOFA Requirement	Data Transfer Model	Data Description
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in Census Blocks of No Greater Than Two Square Miles in Area.
Appendix A: 1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census Blocks Larger in Area Than Two Square Miles.
Appendix A: 1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address.
Appendix A: 3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points.
Appendix A: 4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing.

The provider data collected by CN on behalf of the state of Tennessee have been formatted per the given specifications and uploaded into the appropriate feature classes of the SBI Data Transfer Model. Wireline availability is contained within census blocks and road segments, wireless availability is contained as polygons of coverage areas, and middle-mile connections and Community Anchor Institutions are contained as point data. All speed data is contained at the census block, road segment, or wireless polygon level of availability. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information as possible.

Connected Nation has continued outreach to satellite providers on their availability, technology, and speed information, but granular coverage is not yet available. Submitted within the wireless feature class are the satellite companies providing service to Tennessee as a polygon of the state boundary. Efforts will continue to collect, process, or otherwise create more granular satellite data based on availability analyses and guidance received from NTIA. Process development continues as well to be able to create more granular satellite coverage based on satellite equipment positioning and geographic inputs.

TENNESSEE FIELD VALIDATION METHODOLOGY

CN focused a portion of its time on specific validation processes such as:

- conducting random spectrum analysis studies throughout the state using an Avcom PSA-37-XP spectrum analyzer;
- conducting mobile speed tests throughout the state using an iPhone, Android (or other smart phone) as well as provider-specific aircards (Sprint 3G/4G, Clearwire et al);
- identifying pre-selected, provider-submitted wireless transmit tower sites and cross-referencing data about that tower against the Federal Communications Commission (FCC) databases such as Antenna Structure Registration and/or the Universal Licensing System;
- cross-referencing Federal Registration Number data against available FCC Form 477 data as well as the FCC **CO**mmission **RE**gistration **S**ystem (CORES);
- validating provider submitted data (for example: latitude/longitude) using a handheld Garmin eTrex Summit GPS unit or GPS enabled software such as Microsoft *Streets & Trips*;
- locating physical wire-line attributes (such as Central Offices, Remote Terminals, CATV plant, etc.) and comparing them against provider submitted data; and
- conducting on-net and off-net speed tests using the FCC portal at http://www.broadband.gov/qualitytest/about/ or using the Ookla Net Metrics enabled speed test utility located on each of CN's program specific websites.

Additionally, CN cross-referenced numerous public documents in order to ensure that all known broadband providers were located and contacted. This included searching membership logs from trade associations (WISPA, WCAI, PCIA, etc.), the Cable Television Fact Book, Public Utility Commission records, Public Service Commission records, Chamber of Commerce, etc.

To date, Connected Nation's staff conducted on-site validation tests in Tennessee on the following providers: Ardmore Telephone Company Inc.; Athena Broadband (also d.b.a. HotShot Wireless); AT&T; Aurora Cable TV; Beasley Wireless; Ben Lomand Rural Telephone Cooperative Inc.; BreezeAir.Net; Bristol Tennessee Essential Services; Cable ONE; Cellular South Inc.; CenturyLink; Charter Communications; Clarksville Department of Electricity (d.b.a. CDE Lightband); Clearwire Corporation; Columbia Power & Water Systems; Comcast; CRU Enterprises; DeKalb Telephone Cooperative Inc.; ECSIS.Net; FiberNet; Frontier Communications Corporation; High Country Online; InfoEd Wireless; Infostructure Cable; Jackson Energy Authority; James Cable; Ken-Tenn Wireless LLC; Leap Wireless International Inc.; Level 3 Communications; Loretto Telephone Company Inc.; Mediacom Southeast LLC (d.b.a. Mediacom Communications Corporation; Rapid Communications LLC and Mediacom); Millington Telephone Company (also d.b.a. Big River); Monster Broadband (also d.b.a DotSpot Wireless; Morristown Utilities; NetEase; North Central Telephone; Planet Connect Internet; QuickRelay Wireless Communications; Skyline Telephone Membership Cooperative; Softek; Spirit Broadband; Sprint Nextel Corporation; Surfmore; TDS Telecom; TEC of Jackson Inc.; Tele-Page; Inc.; Tennessee Wireless (also d.b.a. Orb Wireless); Time Warner Cable (formerly New Wave Communications); T-Mobile USA Inc.; TNWeb; Trenton Cable TV Company; Twin Lakes Telephone; U.S. Cellular; Ultra High Speed Internet; UltraNet; United Telephone Company; Verizon Communications Inc.; West Kentucky Rural Telephone; Wide Open West (formerly d.b.a. Knology of Tennessee); Wisper LLC; and Zito Media.

In addition to the field verification tests that have been conducted, Connected Nation has also conducted work in the field to collect information for the non-participating provider Wisper LLC, which, by nature of the methodology required for this collection, is also included in the above list.

From program initiation through this reporting period, CN has completed in-the-field validation testing against 61 companies (out of a universe of 86 viable providers) totaling 70.93 percent within the State of Tennessee. This percentage also considers the non-participating provider record submitted to NTIA as may be contained herein (see "Data Submission and Coverage Estimation of Non-Participating Provider" below).

CN has also continued to review provider datasets for accurate speed information, platform listings, and other intricacies that may fall outside of the standard SBI Data Transfer Model parameters, as published on the NTIA Grantee Workspace on December 14, 2012. Any providers whose submitted coverage and attributes are anticipated to come into question have been further reviewed and confirmed; details on a case-by-case basis are presented below.

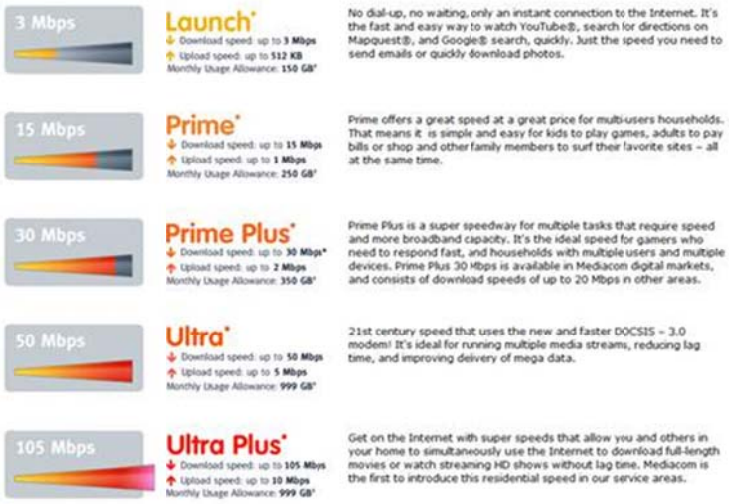
Columbia Power & Water Systems
Issue: Technology of transmission code 41 with maximum advertised download speed in tier 8, higher than expected value range for the technology.
Resolution: Provider website advertises up to 50 Mbps service, which requires DOCSIS 3.0 modem, however, most of the system is still on DOCSIS 2.0; screenshot below.

Residential Service Packages for Cable TV Subscribers

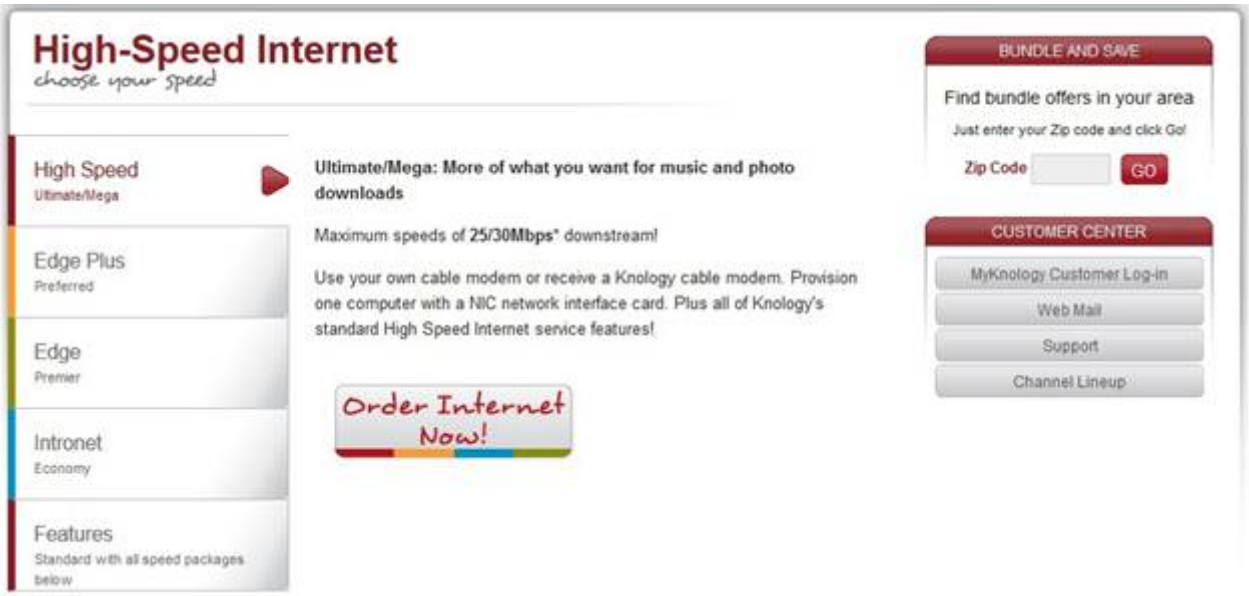
PowerNet Basic	$ 24.95
Up to 3.0 Mbps download/384 kbps upload	
PowerNet 5.0	$ 29.95
Up to 5.0 Mbps download/512 kbps upload	
PowerNet 8.0	$ 34.95
Up to 8.0 Mbps download/896 kbps upload	
PowerNet 12.0	$ 42.50
Up to 12.0 Mbps download/1.2 Mbps upload	
PowerNet 18.0	$ 52.95
Up to 18.0 Mbps download/1.8 Mbps upload	
PowerNet 50.0	$ 60.00
Up to 50.0 Mbps download/5.0 Mbps upload (Requires DOCSIS 3.0 modem.)	

Comcast Cable Communications, LLC
Issue: Technology of transmission code 40 with maximum advertised download speed in tiers 6 and 7, lower than expected value range for the technology.
Resolution: Confirmed use of DOCSIS 3.0 with speed tier 7. Speeds are kept lower currently to be backwards compatible.

Mediacom Southeast LLC
Issue: Technology of transmission code 40 with maximum advertised download speed in tier 8, lower than expected value range for the technology.
Resolution: Provider website advertises up to 50 Mbps service with DOCSIS 3.0 modem; screenshot below.



WideOpenWest Finance, LLC.
Issue: Technology of transmission code 40 with maximum advertised download speed in tier 8, lower than expected value range for the technology.
Resolution: Provider website advertises 25 Mbps service; screenshot below. Please note that while WOW! acquired Knology, the WOW! website still displays Knology-based web pages for this state's coverage.



DATA SUBMISSION AND COVERAGE ESTIMATION OF NON-PARTICIPATING PROVIDERS (NPP)

As part of its ongoing broadband mapping efforts, CN has developed a series of processes with the goal of submitting coverage estimation mapping data to NTIA for every known and qualifying last-mile broadband provider, regardless of platform type (cable modem, DSL, fixed wireless, etc.). Appendix A presents full reports on the estimated broadband service territory for the providers in this state that have either been non-responsive or that have refused to participate in the SBI mapping initiative as of April 2013. These coverage estimation reports are for non-participating providers whose data has not been previously submitted to NTIA in past mapping cycles.

The section below provides a summary of the status of CN's outreach and findings on all non-participating provider coverage for the April 2013 SBI submission.

TNWeb
The coverage estimation for TNWeb was not updated from the previous submission in October 2012. The full white paper containing the most recent coverage estimation for this provider can be found within the October 2012 submission to NTIA.

WISPER, LLC

Coverage for this NPP is being submitted for the first time; please find a white paper on provider outreach and coverage estimation in Appendix A.

PROVIDER VALIDATION METHODOLOGY

Broadband providers maintain their service area data in many different formats, all in varying levels of complexity and granularity. In order to ensure that the data required by the NTIA is standardized across all providers and that it is as accurate as possible, CN translates and formats the data that providers are able to supply into a GIS shapefile and produces maps for the provider to review. The resulting map(s) and review process allow for providers to see their service area in a geographic format – for some providers, this is the first time they have seen maps of their broadband service area. Having the mapped service area allows providers to quickly identify any issues that appear in the data representation, whether the issue is in the data translation into a GIS format or from the original data collection and submission. Often data is provided from various sources and through the review and revision process, local engineers who operate the networks and work in the field are able to ensure that the tabular data that has been submitted is accurate and represents the real-world network extent. Any issues in how the service area is represented on the map(s) are remedied by CN, whether they are additions, removal of service, or any other revisions. Revised maps of service area representations are sent to the provider for review and approval; CN will revise data and return maps as many times as necessary until the provider is in agreement that the map represents their service area as accurately as possible. Once the review process has been completed and final approval of the data is provided, the data is deemed ready for NTIA submission.

Once the data collection has been aggregated at a statewide level, static maps of statewide and county-level availability are produced and made publicly available. In addition, consumers can visit the interactive online tool, My ConnectView, to create customized views of broadband service areas and analyze corresponding demographic information. Leveraging broadband service data on various platforms allows for public users, providers, and other stakeholders to review, scrutinize, and provide feedback on the represented data. This feedback becomes a validation method in itself, as consumers submit inquiries to CN either affirming where service is not available or identifying areas where broadband service is shown on the map, but in actuality is not available. This allows for a follow-up to providers regarding revisions to the data as it is represented; it also allows for CN to identify locations where on-site visits may be necessary to complete field validation of available services. Public feedback on all forms of mapping products serves as a localized validation method for provider-supplied information and allows CN to resolve inaccuracies as they are identified to ensure that only the highest quality information is provided to stakeholders.

Additionally, non-participating provider narratives that were submitted in previous mapping cycles are subjected to the same level of scrutiny. Occasionally, a provider may elect to voluntarily participate (thus eliminating the need for future data estimation activities in the field). However, more often than not, the NPP narrative is updated with a combination of data gleaned from the provider's website, data obtained through FCC research and/or data collected/verified in the field by a CN staff engineer.

Estimates derived from provider-validated data indicate that approximately 3.58 percent of Tennessee households do not have terrestrial fixed broadband service available, and approximately 0.22 percent of Tennessee households have neither mobile nor fixed broadband service available.

Within rural areas of the state, results derived from provider-validated data indicate that approximately 6.65 percent of rural Tennessee households do not have terrestrial fixed broadband service available, and approximately 0.41 percent of rural Tennessee households have neither mobile nor fixed broadband service available. Please note that the availability estimates presented are based on Census 2010 household information.

The estimates above, in accordance with NTIA's definition of available broadband service as specified in the SBI NOFA, include broadband service with download speeds of at least 768 Kbps and upload speeds greater than 200 Kbps.

In addition, due to the nature of the SBI data collection methodology as defined by the NTIA and based on both census block geographic units and street segment data, the estimates of broadband availability derived from provider-validated data may include an overstatement of the actual number of households with broadband availability. Under the census block-based data collection method, a provider will typically report broadband availability for an entire census block whether its network is present across the whole or only a subset of that census block. This potential overestimation at the census block level can be amplified as the data is aggregated across the entire state.

WIRELESS METHODOLOGY

Broadband Service Availability in Provider's Service Area
Wireless Services Not Provided to a Specific Address

Data solicited from a fixed wireless provider to create propagation models include, but are not limited to:

1. The name of the structure.
2. Whether the transmitting device is operational or proposed.
3. The maximum advertised downstream speed, the maximum advertised upstream speed.
4. The typical downstream speed, the typical upstream speed (peak periods for both).
5. The frequency range of spectrum being used (as prescribed by NTIA). This may include (but is not limited to) spectrum authorizations identified within the Federal Communications Commission (FCC) Universal Licensing System (ULS) database or located on the FCC's Spectrum Dashboard. This research often proves to be exceptionally effective when estimating the coverage area of an NPP.
6. The primary population center(s) being served (for geopolitical boundary reference).
7. The physical address of the transmit site (in the event latitude/longitude is unavailable from the provider this allows a quick reference point for geocoding).

8. Latitude in either Degrees, Minutes, and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
9. Longitude in either Degrees, Minutes and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
10. Antenna pattern (e.g. omnidirectional, 180°, 120°, 90°, etc.).
11. Azimuth of antenna (e.g. 360° with magnetic declination if known).
12. Approximate transmit radius (in feet, miles, or kilometers).
13. Polarity of transmit antenna (Vertical or Horizontal).
14. Transmit antenna gain (in dBi).
15. Line loss (applicable only to providers using coax, heliax, waveguide or other forms of cabling – excludes power-over-Ethernet devices).
16. Mechanical and/or Electrical beam tilt (if applicable).
17. Equipment Manufacturer (allows easy cross-reference against manufacturer's specification sheet).
18. Power output of the transmitting device (if unknown, FCC standards or manufacturer specifications are applied).
19. AMSL at base of tower site.
20. Antenna centerline AGL (height of antenna above ground level measured at the centerline of the actual antenna).
21. Foliage factors (Evergreens/Deciduous and percent of ground cover).
22. Ground Clutter (primarily used in rural areas to account for foliage and in metropolitan areas to account for types and heights of buildings if known).
23. Average gain of receive antenna.
24. Receive antenna is estimated at height above average terrain (HAAT) of 6.2 meters/20 feet.
25. Federal Registration Numbers (if applicable) which may allow opportunities to cross-reference and/or obtain additional data from the FCC's ULS and the **CO**mmission **RE**gistration **S**ystem.

Propagation modeling combines scientific data and empirical mathematical formulation for the characterization of radio wave propagation as a function of frequency, distance, and other conditions. Propagation software(s) typically use the Irregular Terrain Model (also known as Longley-Rice) of radio propagation for frequencies between 20 MHz and 20 GHz. This model is based on electromagnetic theory and statistical analyses of the combination of terrain features and radio measurements, then predicting the median attenuation of a radio signal as a function of distance and the variability of the signal in time and in space. For metropolitan areas, the software can typically be adjusted to use the Okumura-Hata model, which accounts for predicting the behavior of cellular transmissions in areas where buildings are the primary obstructions. The resulting product from either model depicts a graphical illustration of the theoretical propagation characteristics of a selected frequency range based on defined variables (receiver sensitivity of the home/mobile device, foliage factor, and digital elevation terrain input).

After converting propagation models into a geospatial format, additional processing is completed to remove the small pixels representing service present in the resulting dataset. These areas are initially created based on the parameters entered in the software from the provider equipment information, the underlying data parameters of elevation, hill shade, etc., and the limitations of the software itself to display a broadband service area as accurately as possible. Generally, these random pixel striations appear as a result of signal levels reaching the highest elevated points within the prescribed radius. Typically, while this pixilation anomaly shows legitimate areas where signals can be received, these highly elevated points may have exceedingly sparse populations or are entirely void of population. As a result, and congruent to the *Wireless Technology Methodologies and Business Logic* white paper submitted to NTIA on January 20, 2011, all independent pixels representing service that are less than 0.125 square miles in area have been removed from the geospatial representation of each wireless provider.

BROADBAND INQUIRIES METHODOLOGY

CN collects consumer feedback in the form of broadband inquiries (BBIs). These inquiries represent any type of communication received from the public regarding broadband service. Once BBIs are received across the state, this information is overlaid with the broadband availability information which was collected through the SBI program. This allows for a real-world comparison of the broadband landscape to the information received from broadband inquiries. Consumers submitting these inbound comments and/or inquiries are able to provide information regarding five categories: 1) residents who do not have broadband but want it; 2) residents who have broadband but want a different provider; 3) residents who do not have broadband, but the broadband inventory maps indicate that they do; 4) residents who have broadband but want a faster connection speed; and 5) residents who have broadband but want a less expensive service option.

BBIs are submitted frequently by consumers via the Connected Tennessee website. Inquiries often seek help to identify local broadband provider options, or to learn when a specific provider may be able to provide service to that consumer. Consumer comments also provide information which may help modify maps with actual service area information. The primary objectives of CN regarding these inquiries are 1) to improve the accuracy of the state maps with submitted consumer information and follow-up field research; 2) to provide broadband options to consumers through cooperation with mapped providers and by facilitating new broadband service options; and 3) to map and analyze information from consumers about areas of unmet broadband demand and alternatives to currently mapped services. A prime example of the second option is the utilization of the Rural Utility Service satellite eligibility tool. By simply entering the consumer's address, the CN engineer can quickly determine if the consumer meets the initial qualification status for BIP satellite subsidies.

New BBIs are assigned to either the GIS department or the Engineering & Technical Services (ETS) team depending on the category entered by the consumer on the website submission form. The GIS or ETS team members respond to each inquiry according to the information entered by the consumer. Many BBIs can be resolved through desktop research; however, if a BBI requires research in the field, the assigned ETS team member conducts such research when performing field

validations in the area of the inquiry, or at another such time as is practical and appropriate. GIS and ETS team members respond to and conclude BBIs via telephone contact and/or e-mail communication.

The broadband inquiry process has been implemented in each of the CN state programs with successful results. Altogether CN has received over 18,839 broadband inquiries since 2007, allowing the state programs to evaluate each inquiry for broadband demand and data verification. These inquiries are continuously examined against current broadband availability, updated every six months, to determine if previously unserved households have been expanded to and can now receive broadband at their residence. This database of broadband inquiries has also allowed the CN state programs to aggregate demand in concentrated areas to show providers the exact locations where the population has made it clear that they would purchase broadband if it was made available to them. Providers in the states have responded to this process and have expanded to areas knowing that their investment will be worthwhile. Data verification methods have also proven successful, as the state programs have been able to show those inquiries that indicate the broadband service areas are misrepresented on the map to providers, who then verify where service cannot reach in regard to that residence(s). The broadband coverage in these states has been altered to create a more accurate map based on the inquiries submitted by the public.

During this reporting period, the Connected Tennessee project has received a total of 41 inquiries (1,569 grant inception to date). As more inquiries are submitted to Connected Tennessee, a more thorough validation of the broadband landscape can be performed, while also allowing providers to see which areas have a high demand for broadband adoption.

My ConnectView Methodology

My ConnectView is an interactive online mapping tool for viewing, analyzing, and validating broadband data. Developed using Esri's ArcGIS for Server and Adobe's Flex Framework and hosted and maintained by Connected Nation, My ConnectView is a multi-functional, user-friendly way for local leaders, policymakers, consumers, and technology providers to devise a plan for the expansion and adoption of broadband.

First and foremost, My ConnectView allows consumers to locate their residence and identify providers that offer broadband Internet service to that location. The interactive platform allows for users to build and evaluate broadband expansion scenarios using a wealth of data, including several coverage analysis layers, speed analyses, Community Anchor Institutions, and tools to search and export household demographic information, as well as extract data in GIS, spreadsheet, and/or PDF formats.

My ConnectView also features more interactive data layers and additional tools than ever before to allow the consumer to explore the broadband data. My ConnectView provides consumers with the ability to print, e-mail, and provide feedback on the broadband data displayed on the interactive map. Through the collection of this feedback, a visual demand for broadband is presented. This visualization allows the CN state programs the ability to validate the broadband availability for

accuracy. If residents within a region state they are without broadband, but the interactive map shows otherwise, this allows CN to approach the providers within that area in an effort to trim down their coverage to more accurately represent real-world availability on the ground.

The Connected Tennessee project launched My ConnectView on April 2, 2012, and has received 1,132 visits this reporting period; to date the interactive mapping application has received 9,771 visits.

SPEED TEST METHODOLOGY

The 2,381 speed tests that are represented in the Connected Tennessee Speed Test Report during this reporting period (16,817 grant inception to date) are the result of a partnership between CN and Ookla Net Metrics. Utilizing this relationship increases the level of confidence in the data being collected and provides for a far greater sample size than could be collected by a single testing site.

Ookla owns and operates Speedtest.net, as well as develops and deploys speed tests, such as the Connected Tennessee speed test website, for partners around the world. This network of sites that is developed and run on its testing technology provides Ookla with a vast dataset that, due to the variability of geographic information collected across the varying speed test sites, is geocoded utilizing Geo-IP technology. This technology allows for tests to be geocoded to points of aggregation, typically larger nodes across provider networks. While there are hundreds of thousands of tests that have been conducted, the level of aggregation is only sufficient for county-level detail due to the test results being located at these larger nodes and not at an absolute location for each speed test.

In an effort to validate broadband data from the Connected Tennessee project, speed test information is collected throughout the state. Speed tests provide speed information on the path taken through all networks (a provider's network as well as additional networks) a local machine must connect to in order to reach the host test. The benefit of this collection of speed information is two-tiered. First, it allows for a comprehensive dataset of speeds, while also providing Connected Tennessee with the information on where broadband services are available. Second, unlike theoretical speed information which may be received through the data collection process, the use of speed tests provide real-world information on the speeds that currently exist within the State of Tennessee.

PROVIDERS DEEMED NON-VIABLE

The following list of companies represents the remainder of the broadband provider universe that was originally identified as complete for outreach to begin for the State Broadband Initiative. These providers are not included in the Data Package for the April 2013 submission because they have been deemed non-eligible under the parameters and guidance of the SBI grant program. This list of companies includes, but is not limited to: providers offering service but below the current definition

of broadband, those that have gone out of business, technology consulting firms, infrastructure or network construction companies, non-facilities based general resellers, etc.

	Company Name	URL	Comments
1	21Globe, Inc.	www.21globe.com	No longer in business, website inactive and references news and events from Cleveland, Ohio.
2	A 007 Access	www.a007.com	General reseller of Quest DSL and mobile wireless; DSL does not qualify as the max advertised speed is 768 kbps x 128 kbps.
3	Aaccess Network Communications	www.aaccess.net	URL no longer in service, not a broadband provider.
4	Access123.net	www.access123.net	URL no longer in service or associated with telecommunications business.
5	ACERX.NET	www.acerx.net	General reseller but no contact information listed on website; requests for information were never returned.
6	Adelphia	n/a	No longer in business; assets liquidated.
7	Aeneas Communications, LLC	www.aeneas.com	Facilities-based CLEC that resells dial-up, DSL, and VoIP to consumers and business accounts.
8	Airespring, Inc.	www.airespring.com	General reseller of VOIP, long distance and data circuits (non-residential).
9	Airewaves Broadband, LLC	www.airewaves.com	URL no longer in service.
10	Airmail247.com	www.airmail247.com	Business mailing list search site; not a broadband provider.
11	America Internet & Communications	www.americainter.net	Offers high-speed business DSL and wireless point-to-point wireless services to business accounts.
12	Antioch Wireless Broadband	www.antiochwirelessbroadband.com	Resells DSL and cellular service in Antioch, IL only.
13	Arrowheadnet.com	www.arrowheadnet.com	Domain registration and web hosting company.

14	Atris	www.atris.biz	Offers VoIP, data, and softphone services to business accounts.
15	bargainisp.net	www.bargainisp.net	Generic web directory site; company does not offer broadband.
16	BeaDun Communications	www.beasleywireless.net	Subsidiary of Beasley Wireless; services offered to business accounts fall below NTIA's definition of "broadband."
17	Broadband National	www.broadbandnational.com	Nonfacilities-based general reseller of DSL and satellite for 36 companies (e.g., ACC Business, HughesNet, et al.).
18	Broadcore, Inc.	www.broadcore.com	Provides business solutions such as VOIP and network integration services.
19	Broadview Networks Holdings, Inc.	www.broadviewnet.com	Wholesale reseller of partners' communication products and services; company is nonfacilities-based.
20	Broadwing Communications	www.level3.com	Acquired by Level 3.
21	BullsEye Telecom, Inc.	www.bullseyetelecom.com	Integrated suite of telecommunications services for businesses and general reseller of backhaul.
22	Business Telecom, Inc. (DeltaComm)	www.earthlinkbusiness.com	B2B services only. Reseller.
23	Camino-Net Internet Services	www.camino-net.com	No longer in business; was dial-up only.
24	CCIS.net	www.ccis.net	Now owned by Beacon Technologies; offers dial-up and is general reseller of DSL in Pennsylvania.
25	Cebridge Connections	suddenlink.net	Acquired by SuddenLink.
26	Celito Communications	www.celito.net	Offers dial-up and wireless in North Carolina.
27	Cinergy Communications Company	n/a	Acquired by Windstream.

28	Cleartouch.Com	www.cleartouch.com	Inactive URL; out of business.
29	Cognisurf	www.cognisurf.com	Offers dial-up only.
30	Deltaforce	www.deltaforce.net	Dial-up and webhosting services only.
31	deluxehost.com	deluxe-host.com	Offers web hosting only.
32	DGUI	www.dgui.com	No longer in business; domain name for sale.
33	Dial National	www.dialnational.com	Inactive URL; out of business.
34	Dialer.net	www.dialer.net	Offers international dial-up services.
35	DIECA Communications, Inc.	n/a	Acquired by Covad; then acquired by MegaPath.
36	Dixie-Net, Incorporated	www.dixie-net.com/wireless	Offers fixed wireless and DSL in Mississippi only.
37	Dresden Cable	n/a	Provider does not offer broadband; limited to CATV and satellite services only.
38	DSL @ Interlync	www.interlync.com	General reseller of DSL, wireless, VoIP, dial-up, web hosting etc.
39	DTS-NET.COM	www.dts-net.com	Provider of wholesale and retail telecommunications services.
40	Eagle One Wireless	www.e1w.com	Offers direct connect wireless internet services to businesses in northeast Mississippi, south central Tennessee, and northwest Alabama.
41	Endless Sphere Technology	www.endless-sphere.com	Electric Vehicle Technology Forums.
42	EnterSource	http://www.entersource.co	General Reseller of HughesNet, Athena Broadband, Charter, AT&T and DishNetwork.
43	Enventis Telecom Inc.	www.enventis.com	Doing business as Hickory Tech; general reseller in Iowa and Minnesota area; local agent claimed they do not offer "broadband services."

44	ETI - Connecting Your World	www.cyberenet.net	General reseller of DSL services from infrastructure owned by Verizon, AT&T, and Covad.
45	Fast Dependable Access	www.fda.net	Not a broadband provider.
46	Gainesboro CATV	n/a	Does not offer broadband, CATV only.
47	Global Crossing Telecommunications, Inc.	http://www.globalcrossing.com	Acquired by another company.
48	Haywood Cablevision	www.cbvnol.com	Out-of-state provider; offers service in the Carolina Mountain area.
49	Highertech.Net	www.highertech.net	Appears to have been acquired by Chattanooga Net.
50	Hubwest Protected Networks LLC	www.hubwest.com	Dial-up and web hosting only recently merged with Southwest Cyberport.
51	iGiles.net (d.b.a. DotSpot Wireless)	http://www.dotspot.net	Acquired by Monster Broadband.
52	Imbris, Inc.	www.imbris.com	Provides fixed wireless in Idaho only.
53	IMGISP.NET	www.imgisp.net	Search engine, generic web page.
54	Incredible Networks	n/a	Inactive URL; out of business.
55	Inercom Communications Inc.	www.inercom.com	Inactive URL; out of business, url for sale.
56	Interactiveinfo.com Inc.	www.rocketbroadband.com	Offers cable television services in NY only.
57	iRadical	n/a	Inactive URL; out of business.
58	ISPartner.net	n/a	Inactive URL; out of business.
59	Jenco Speed Web	www.jencospeed.net	Offers wireless service in Ohio only.
60	Knology of Tennessee, Inc.	http://www.knology.com	Acquired by Wide Open West Finance, LLC (WOW).

61	LARIAT.NET	www.lariat.net	Offers fixed wireless services in Wyoming only.
62	LCSisp.com	www.lcsisp.com	Offers national dial-up services only.
63	Lightyear Network Solutions, LLC	www.lightyear.net	Nonfacilities-based general reseller.
64	LinkAmerica.Net	www.linkamerica.net	Inactive URL; out of business.
65	MacWebTown.Net Works	www.macwebtown.net	McIntosh web services and technical assistance.
66	MainBoard	www.mainboard.cc	General reseller in Virginia.
67	Maine Cable and Wireless	www.mainecableandwireless.com	Inactive URL; out of business.
68	Marcin Company	n/a	Inactive URL; out of business.
69	Metropolitan Telecommunications Holding Company	www.mettel.net	MetTel provides facilities-based and resold services (certified CLEC in some states). The company provides a variety of voice, including wireless, and data services to commercial customers.
70	Millenicom Inc.	www.millenicom.com	General reseller of dial-up and mobile broadband (Sprint network).
71	MYWEBSTAR	www.mywebstar.com	Inactive URL.
72	Nanomega.Com	www.nanomega.com	Inactive URL; out of business.
73	NetAccess, Inc.	www.nas.net	Offers wireless B2B services only.
74	NetFire	n/a	No longer in business.
75	NetSpeed Online	www.netspeed-online.net	Inactive URL; out of business.
76	NetStar Communications	n/a	Offers virtual ISP services and web hosting.

77	New Edge Network, Inc.	www.newedgenetworks.com	Company has no residential service and re-sells backhaul; acquired by Earthlink.
78	NewWave Communications	http://www.newwavecom.com/	Acquired by another company.
79	Northwest ISP	www.northwestisp.com	Inactive URL; out of business.
80	NTCH, Inc.	www.cleartalkwireless.net	Acquired by Cleartalk Wireless.
81	NuVox, Inc.	www.windstream.com	Acquired by Windstream.
82	OnWav, Inc.	www.onwav.com/	Acquired by Twin Lakes Telephone Cooperative.
83	OrbWireless.net	http://www.orbwireless.net	Acquired by Tennessee Wireless.
84	Overarch Broadband	n/a	Offers services in Idaho only.
85	Pacific Internet Exchange	www.pie.us	Inactive URL; company appears to have gone out of business.
86	PAETEC Communications, Inc.	http://www.paetec.com/	Acquired by another company.
87	Paknet Limited	www.ptcl.com.pk	Subsidiary of Pakistan Telephone Company; no services offered in the U.S.
88	Planet Online	www.planetonline.net	Offers website hosting services.
89	Point2Point	www.p2p-innovations.com	Out of business.
90	PremoWeb	www.premoweb.com	Offers national dial-up services only.
91	Qwest Communications Company, LLC	www.centurylink.com	Acquired by CenturyLink.
92	Rapid Communications, LLC	n/a	Acquired by Mediacom; subsequently acquired by Comcast.
93	Renaissance Networks	www.renaissancenetworks.com	Offers IT support to small businesses in New Mexico.

94	Rural Tennessee Wireless Broadband (RTWB)	http://www.rtwb.net/	No longer in business.
95	Scott County Telephone Cooperative	www.sctc.org	CLEC offering business class services only.
96	Shentel Converged Services, Inc.	www.shentel.com	Shentel Converged Services is classified as a Private Cable Operator and offers service to MDU housing facilities.
97	SI Wireless	www.siwirelessco.com	Resells Sprint 3G services.
98	Simply Dialup A Metrogeek Company	www.simplydialup.com	Offers dial-up only.
99	Sling Broadband	www.slingbroadband.com	Out-of-state provider; offers DSL and wireless services to business accounts in Florida.
100	Smartresort Co, LLC	www.baldwincountyinternet.com	General reseller of local ISP services.
101	Solavei, LLC (Solavei)	http://www.solavei.com/	Reseller of mobile services on T-Mobile network.
102	Solutions IT Consulting, LLC	www.solutionsitc.com	Technology consulting firm.
103	Sparkplug Chicago, Inc.	www.airband.com	Offers point-to-point wireless and business solutions in Illinois.
104	Spring City Cable	n/a	Out-of-state provider; offers services in Utah only.
105	Surferz.Net	www.surferz.net	Offers dial-up in upstate NY only.
106	T1 Shopper	www.t1shopper.com	Search engine for general reseller.
107	Talk America Inc.	www.cavtel.com	Acquired by Cavalier Business Communications.
108	Telovations, Inc.	www.telovations.com	IT and IP solutions consultant.
109	The Nexus Group, Inc.	www.nxs.net	General reseller of AT&T DSL.

110	Total Access Networks, Inc.	www.totalaccess.net	Inactive URL.
111	TSISP.NET	www.tsisp.net	Inactive URL; out of business.
112	Two Rivers Media	n/a	Inactive URL; acquired by MediaCom.
113	University Corporation for Advanced Internet Development	www2.ntia.doc.gov/grantee/university-corporation-for-advanced-internet-development	Currently ineligible under the parameters and guidance of the SBI grant program.
114	UNUM Telecommunications, Inc.	www.utinet.net	Inactive URL; out of business.
115	VOLstate, Inc.	www.volstate.net	Offers Internet solutions and technical support to business accounts.
116	Waypoint Wireless	n/a	Consulting firm.
117	WilTel Communications, LLC.	www.level3.com	Acquired by Level 3.
118	Wireless Roanoke, Inc.	www.wirelessroanoke.com	Inactive URL; out of business.
119	wisbin	www.wisbin.com	Wisconsin broadband provider.
120	WorldCom Broadband	n/a	Acquired by Verizon.
121	Worldspice.net	www.worldspice.net	Offers web hosting and connectivity to business accounts.
122	www.AmericanAngel.us	www.americanangel.us	Inactive URL; out of business.
123	Xpansion Network	n/a	No longer in business.
124	XTN	www.xtn.net	URL redirects to Jones Media.
125	YEYZOO.NET	www.yeyzoo.net	Inactive URL; out of business.

126	YLISP (Your Local ISP)	www.itsyournet.com	Resells DSL and dial-up.
127	YourT1Wifi.com	yourt1wifi.com	Offers wireless service in Idaho only.
128	ZOOM Internet Services, LLC	n/a	Michigan-based dial-up provider and web hosting company.

APPENDIX A: ESTIMATION OF NON-PARTICIPATING PROVIDER

WISPER, LLC

WISPER, LLC

As part of its ongoing broadband mapping efforts, Connected Nation (CN) has developed a series of processes with the goal of submitting mapping data to NTIA for every known and qualifying last-mile broadband provider, regardless of whether the provider has chosen to support and participate in the State Broadband Initiative (SBI) mapping program.

The following narrative provides detail regarding the recent data collection activities related to Wisper, LLC, (WISPER) a wireless Internet service provider (WISP), located in Alamo, Tennessee, with a service area around Crockett County. The narrative will include information regarding how and where CN obtained publicly available data and the on-the-ground due diligence, verification, and validation techniques that support the underlying data.

Background

CN staff members have continued trying to obtain the participation of the provider with 36 instances of communication via telephone, e-mail, and office visits since October 1, 2010, through February 13, 2013. Only one communication was answered wherein the provider returned a non-disclosure agreement (NDA) on February 22, 2011, (initially furnished October 4, 2010, and delivered in-person a second time by CN staff on January 26, 2011). After returning a final, fully executed NDA to the provider, telephone and e-mail outreach has yielded no response or indication of participatory status throughout subsequent data submission cycles.

A CN staff member visited the WISPER office on April 23, 2012, to discuss the broadband mapping project in person with WISPER staff and was not afforded the privilege of meeting with a "decision maker." While conducting data collection and verification of the provider's footprint, CN staff members stopped by WISPER offices again on February 20, 2013, and were informed that WISPER staff was unavailable and unable to arrange an appointment.

The Issue

WISPER, by its lack of responsiveness since February 22, 2011, has predicated its unwillingness to participate in the Connected Tennessee broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN began amassing a file based on desktop research of information and, as time progressed, expounded upon information that could be obtained through the public domain. CN began by reviewing the provider's website (www.gowisper.com) to identify residential service plans **(Exhibit A)** offered on the provider's wireless network, wherein the provider's service area was excluded from their website. A search for a Federal Registration Number (FRN) on the FCC **CO**mmission **RE**gistration **S**ystem (CORES) yielded an FRN of 0021091053 **(Exhibit B)** with contact information relative to the owner of the company.

Exhibit A: Service Plans

Exhibit B: Federal Registration Number

Registration Detail	
FRN:	0021091053
Registration Date:	08/16/2011 10:58:00 AM
Last Updated:	02/21/2012 03:43:00 PM
Business Name:	WISPER, LLC.
Business Type:	Private Sector , Limited Liability Corporation
Contact Organization:	WISPER, LLC.
Contact Position:	Owner
Contact Name:	Mr Matt Abernathy
Contact Address:	1398 N Cavalier Dr Alamo, TN 38001 United States
Contact Email:	mabernathy@gowisper.com
ContactPhone:	(731) 668-3042
ContactFax:	

In order to corroborate field validation of transmit sites and wireless access points, the provider FRN was referenced against the FCC Universal Licensing System (ULS) to identify any authorizations (or leases as the case may be) that the provider may hold which could possibly enhance locating active transmit sites and wireless access points for the service area. During this process, CN Staff identified: (a) an authorization for Station WQPK327 with 0 registered transmit/receive sites; a 3650-3700 MHz license **(Exhibit C**) and (b) two active lease agreements for Educational Broadband Service (EBS) stations centered over Jackson, Tennessee and a second co-channel station to the northwest of Jackson, Tennessee (Station call signs WLX621 and WLX817 respectively **(Exhibit D)**.

The coverage estimation contained herein is predicated entirely on WISPER's use of unlicensed frequencies. The recent lease agreements for Station's WLX621 and WLX730 indicate that WISPER and the EBS licensee *intend* to use the licensed spectrum in the near future for the deployment of fixed wireless broadband services (perhaps in addition to the coverage already provided using unlicensed spectrum). CN will continue to monitor the FCC's database to determine if expansion occurs prior to the next mapping cycle in October 2013.

While reviewing the aforementioned lease agreements, CN staff discovered that Lessee/Lessor(s) have filed proposed coverage plans with the FCC for the use of this EBS spectrum.

Exhibit C: FCC ULS Search; License – Station WQPK327

MAIN | ADMIN | LOCATIONS

Call Sign	WQPK327	Radio Service	NN - 3650-3700 MHz
Status	Active	Auth Type	Regular
Dates			
Grant	06/12/2012	Expiration	06/12/2022
Effective	06/12/2012	Cancellation	
Area of Operation: N			
Operating Nationwide including Hawaii, Alaska, and US Territories.			
Frequency Bands			
003650.00000000-003700.00000000			
Licensee			
FRN	0021091053 (View Ownership Filing)	Type	Limited Liability Company
Licensee			
WISPER, LLC 1398 N Cavalier Drive Alamo, TN 38001 ATTN Matt Abernathy		P: (731)668-3042 F:(731)664-9750 E:mabernathy@gowisper.com	

Exhibit D: EBS License Spectrum Leasing Arrangement and Geographic Service Area for StationWLX621

Federal Communications Commission
Wireless Telecommunications Bureau

Spectrum Leasing Arrangement

ATTN: THOMAS P. FARRELL
EDUCATIONAL BROADBAND CORP.
8602 FRONTGATE LN.
INDIANAPOLIS, IN 46256

Date: 07/20/2012
Reference Number: 5413066

This approval allows the Lessee to lease spectrum from the Licensee pursuant to the provisions and requirements of Subpart X of Part 1 of the Commission's Rules, 47 C.F.R. Part 1, and as described in the associated spectrum leasing application or notification.

Type of Lease Arrangement	Lease Term	Lease Identifier
De Facto Transfer Lease	Long Term	L000009365

Lease Grant/Accepted Date	Lease Commencement Date	Lease Expiration Date
03/21/2012	03/21/2012	07/31/2022

Call Sign	Radio Service
WLX621	ED - Educational Broadband Service

Lessee Information

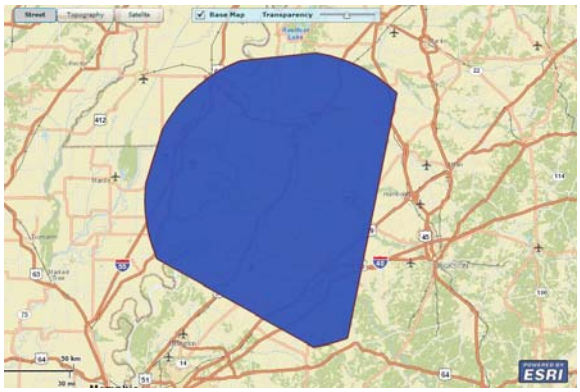
0021091053
WISPER, LLC
Attn: GEORGE M. ABERNATHY
1398 N CAVALIER DRIVE
ALAMO, TN 38001

Licensee Information

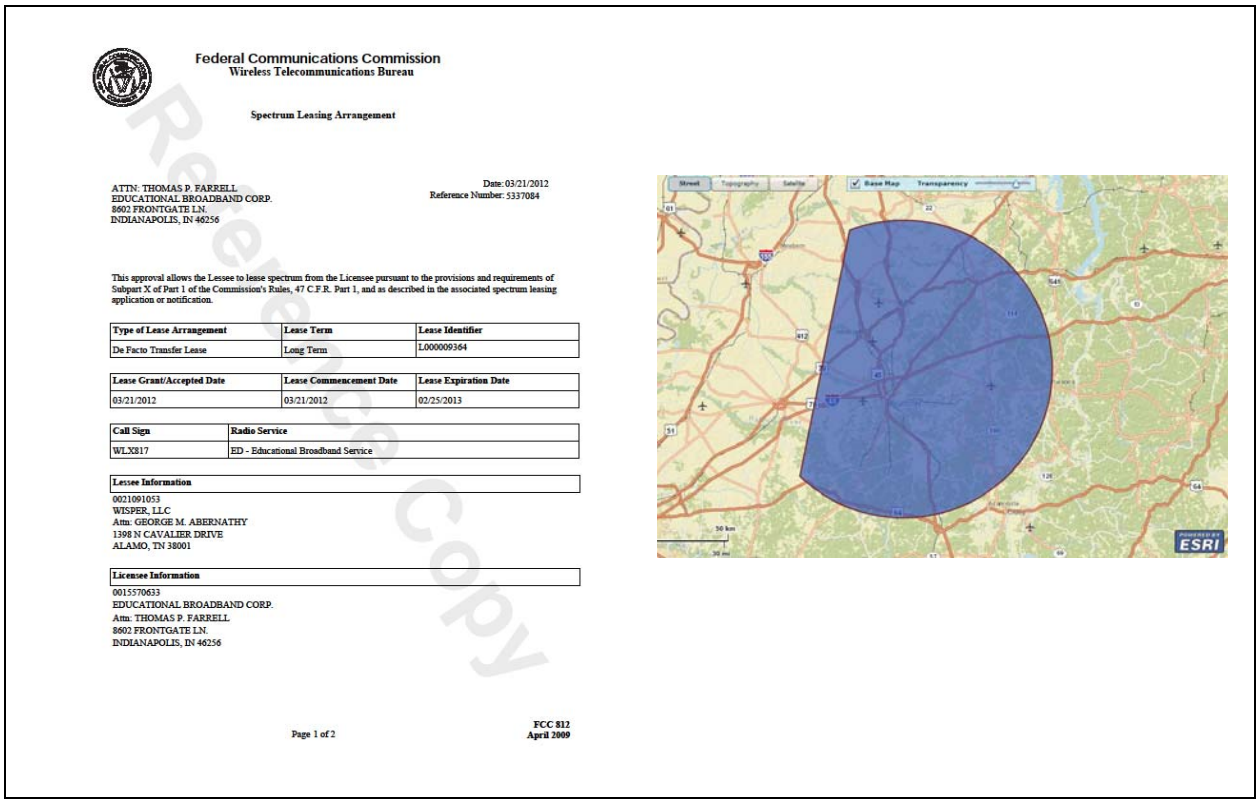
0015570633
EDUCATIONAL BROADBAND CORP.
Attn: THOMAS P. FARRELL
8602 FRONTGATE LN.
INDIANAPOLIS, IN 46256

Page 1 of 2

FCC 812
April 2009



EBS License Spectrum Leasing Arrangement and Geographic Service Area for StationWLX817



Federal Communications Commission
Wireless Telecommunications Bureau

Spectrum Leasing Arrangement

ATTN: THOMAS P. FARRELL
EDUCATIONAL BROADBAND CORP.
8602 FRONTGATE LN.
INDIANAPOLIS, IN 46256

Date: 03/21/2012
Reference Number: 5337084

This approval allows the Lessee to lease spectrum from the Licensee pursuant to the provisions and requirements of Subpart X of Part 1 of the Commission's Rules, 47 C.F.R. Part 1, and as described in the associated spectrum leasing application or notification.

Type of Lease Arrangement	Lease Term	Lease Identifier
De Facto Transfer Lease	Long Term	L000009364

Lease Grant/Accepted Date	Lease Commencement Date	Lease Expiration Date
03/21/2012	03/21/2012	02/25/2013

Call Sign	Radio Service
WLX817	ED - Educational Broadband Service

Lessee Information

0021091053
WISPER, LLC
Attn: GEORGE M. ABERNATHY
1398 N CAVALIER DRIVE
ALAMO, TN 38001

Licensee Information

0015570633
EDUCATIONAL BROADBAND CORP.
Attn: THOMAS P. FARRELL
8602 FRONTGATE LN.
INDIANAPOLIS, IN 46256

Page 1 of 2

FCC 812
April 2009

Preliminary Identification of Provider's Coverage Area

Connected Nation was unable to extract a service area map from the provider's website and began a series of searches on the public domain and conducted on-the-ground research to estimate the WISPER, LLC service area. Due to scarcity of information available pertaining to the provider's coverage, exact coverage area was largely undetermined until visual confirmations and on-site testing were conducted with in the greater Alamo, Tennessee area.

Testing Techniques

Utilizing the information garnered from the FCC ULS database and the FCC Lease search database, Connected Nation determined that it was best to use the WISPER, LLC office as a central starting point for its on-the-ground due diligence. Using the known office location, (35.80886, -89.15583) CN engineers began by logging all visual confirmations of wireless transmit and customer premise equipment to determine which of these were, indeed, a part of WISPER, LLC's footprint. Each test point included a spectrum sweep and analysis using an Avcom PSA-37XP spectrum analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands **(Exhibit E)**. Each validation point was then similarly scrutinized for frequency of operation. A screen image of the operating frequency (or frequencies) was captured; general notes were recorded for each location-approximate antenna height, frequency of operation, antenna type (omnidirectional or sectored) and photographs were taken of the access points. **(Exhibit F, Exhibit G).**

Exhibit E: Actual Spectrum Analyzer Screenshot Sample

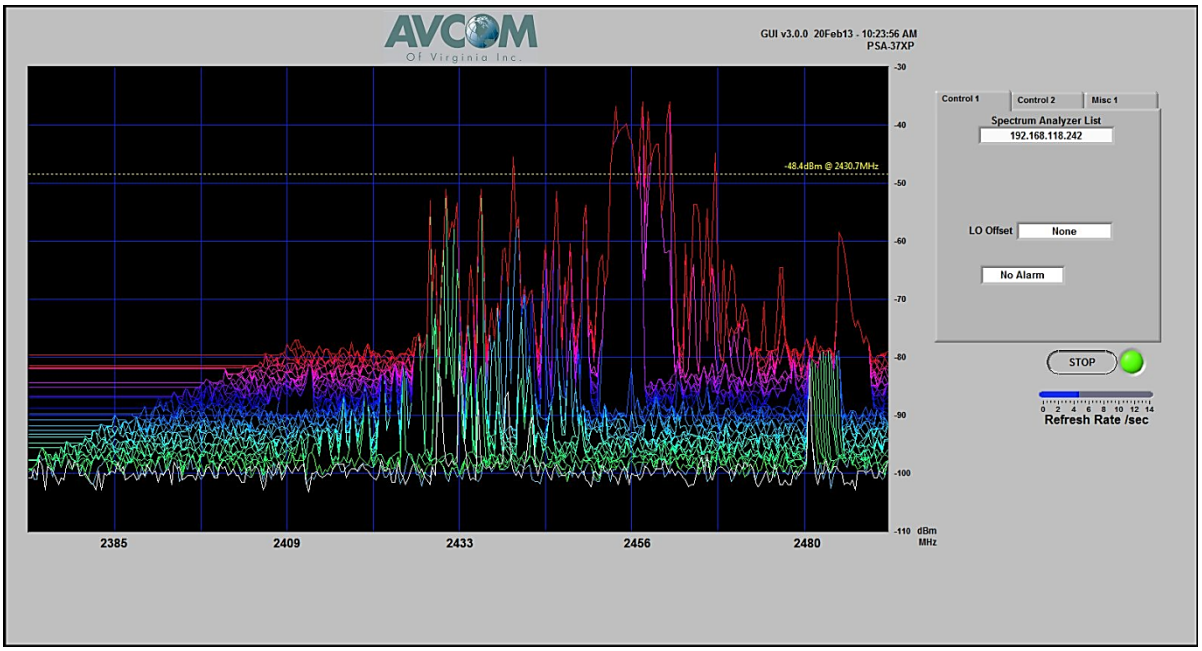


Exhibit F: Supporting Field Validation Points for WISPER

CPE

Fire Department Transmit Site

Transmit Tower at Gibson Electric

CPE

Crockett High School

"Good News" Transmit Tower

Exhibit G: Recorded Data for WISPER

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
				Test Site Info					Engineer	Coordinates		Platform Type		Visual Confirmation		
Site #	Date	Provider	FRN Validation	Test City	Test State	Test County	Physical Address	Location Description	Engineer	(N) Lat Decimal	(W) long Decimal	Type	Presence Confirmed	Type	Images	Equipment
1	2/20/13	WISPER, LLC	Yes	Alamo	TN	Crockett	1398 N. Cavalier Drive, Alamo, TN 38001	Provider HQ	CN Staff	35.80886	89.15583	Fixed Wireless	Yes	Sales Office	Yes	Avcom PSA-37/XP
2	2/20/13	WISPER, LLC	Yes	Alamo	TN	Crockett	77-99 S. Mulberry Street, Alamo, TN 38001	Residential CPE	CN Staff	35.78349	89.11086	Fixed Wireless	Yes	Wall Mounted Equip	Yes	Avcom PSA-37/XP
3	2/20/13	WISPER, LLC	Yes	Alamo	TN	Crockett	106 Alamo, TN 38001	Flower Shop CPE	CN Staff	35.78307	89.11738	Fixed Wireless	Yes	Wall Mounted Equip	Yes	Avcom PSA-37/XP
4	2/20/13	WISPER, LLC	Yes	Bells	TN	Crockett	7300 Highway 412 S, Bells, TN 38006	GM Tower	CN Staff	35.72502	89.0567	Fixed Wireless	Yes	Wireless Cell Site	Yes	Avcom PSA-37/XP
5	2/20/13	WISPER, LLC	Yes	Alamo	TN	Crockett	402 Eggihill Road, Alamo, TN 38001	Gibson Electric Tower	CN Staff	35.78445	89.1401	Fixed Wireless	Yes	Wireless Cell Site	Yes	Avcom PSA-37/XP
6	2/20/13	WISPER, LLC	Yes	Alamo	TN	Crockett	121 E. Park Street, Alamo, TN 38001	SM Fire Dept	CN Staff	35.78336	89.11502	Fixed Wireless	Yes	Other	Yes	Avcom PSA-37/XP
7	2/20/13	WISPER, LLC	Yes	Alamo	TN	Crockett	336 S Bells St, Alamo, TN	Thatshot,LLCCPE	CN Staff	35.78012	89.11719	Fixed Wireless	Yes	Wall Mounted Equip	Yes	Avcom PSA-37/XP
8	2/20/13	WISPER, LLC	Yes	Alamo	TN	Crockett	2136 TN 88, Alamo, TN 38001	Crockett High School	CN Staff	#REF!	89.15221	Fixed Wireless	Yes	Wall Mounted Equip	Yes	Avcom PSA-37/XP
9	2/20/13	WISPER, LLC	Yes	Bells	TN	Crockett	Gum Flat Road and PineHills Intersection, Bells, TN	Gum Flat Tower	CN Staff	35.74439	89.98803	Fixed Wireless	Yes	Other		Avcom PSA-37/XP

Results and Submission for April 2013

Of the nine locations visited during the validation point route, four access points were identified and relative information was logged into the WISPER, LLC field validation map **(Exhibit H)**. The field data, combined with the publicly available data, were transferred to the Connected Nation provider information file. A composite propagation study was completed based on the field data **(Exhibit I)**. Both documents were forwarded to WISPER, LLC who was advised that the coverage estimation (along with this document) would be submitted to Connected Tennessee and to the NTIA for the April 2013 broadband mapping project for processing unless the provider notified CN of any discrepancies within a 48-hour period. The provider responded within the 48 hour period and did not dispute the accuracy of the estimated coverage (as presented herein) but stated "We have coverage in Crockett, Haywood, Madison, Lauderdale, Fayette, Hardeman, Chester, McNairy, Henderson, Carroll, Weakley, Henry, Obion, Gibson, Tipton, and Dyer.. We have 128 towers in these counties…our footprint is a lot larger." The provider, however, did not submit any additional detail, coverage maps or datasheets (at this time).

CN will continue attempts to secure participatory status and involvement from the provider directly and corroborate the additional information mentioned herein for inclusion in future NTIA mapping submission cycles.

Exhibit H: Field Validation Map Points

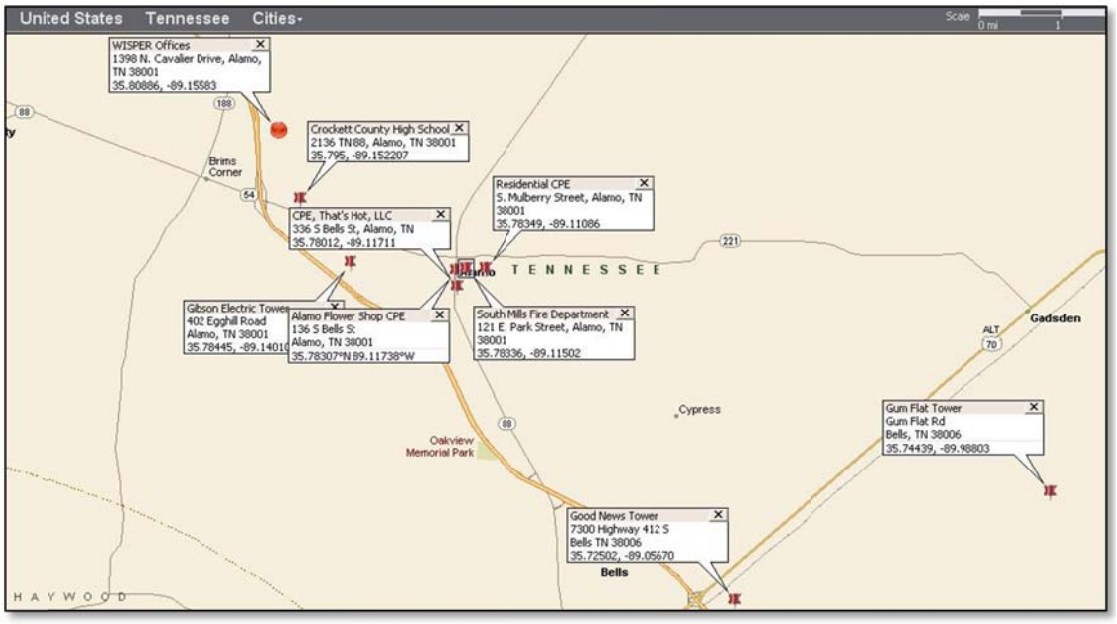
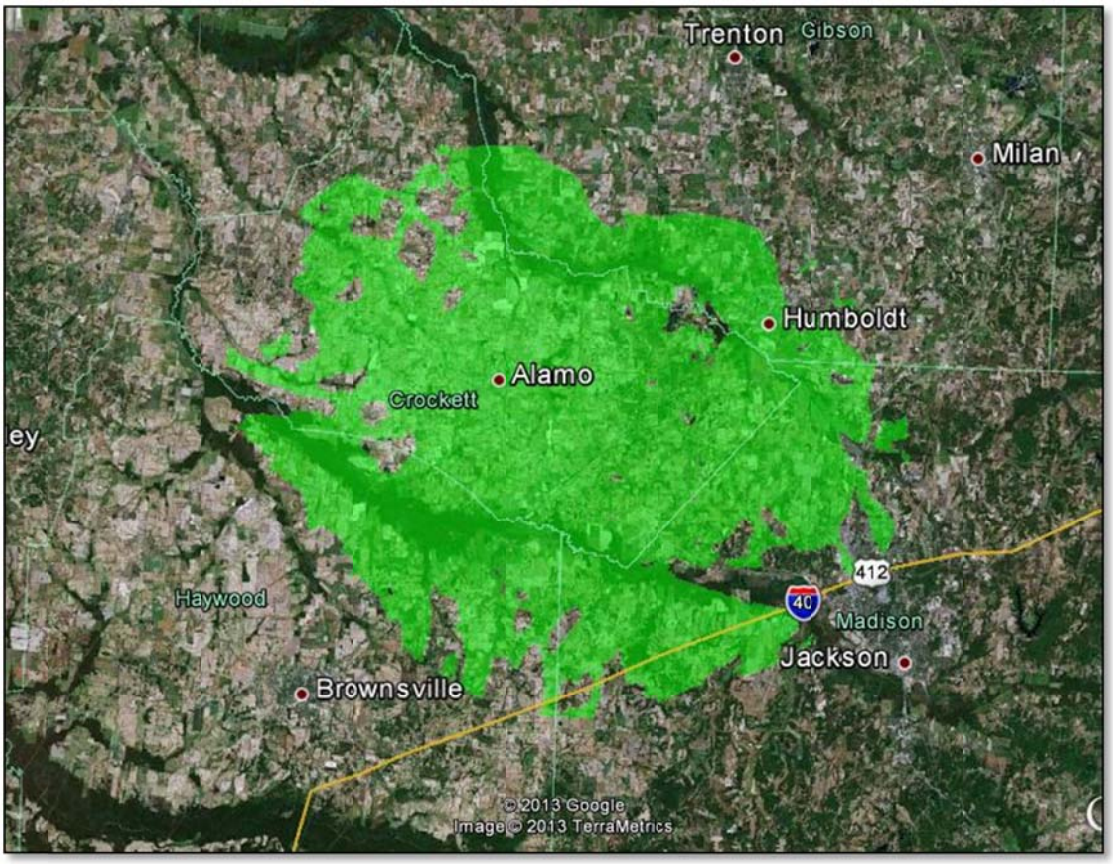


Exhibit I: WISPER, LLC Composite Coverage



APPENDIX B: BROADBAND PROVIDER LOG

Broadband Provider Log

Complete	109
Non-Responsive/Refused	3
In Progress	3
Reseller Providing Data	0
Count of Datasets by Status	**115**
Total Unique Providers Represented	**86**

Provider Name	Platform	Status	NDA Execution Date	Notes
Ardmore Telephone Company Inc	DSL	Data Added to Statewide Inventory	2/16/2010	[FEB-12-13 Frank Aryee] Correction: The different service area speed levels were revised and realigned.
AT&T Inc.	DSL	Data Added to Statewide Inventory	12/16/2009	[MAR-01-13 Frank Aryee] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
AT&T Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/16/2009	[FEB-18-13 Frank Aryee] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Athena Broadband	Fixed Wireless	Data Added to Statewide Inventory		[MAR-14-13 Frank Aryee] Change: Athena Broadband split away from EnterSource; submitted entirely new dataset with expanded coverage, and higher speeds of tier 7 download in certain areas.
Cable ONE Inc.	Cable	Data Added to Statewide Inventory	12/7/2009	[MAR-12-13 Frank Aryee] Change: Provider expanded coverage to additional areas in Dyer and Crockett Counties. Some coverage were also removed from both counties.
Capshaw Enterprises, LLC	Fixed Wireless	Data Added to Statewide Inventory	10/20/2011	[MAR-12-13 Frank Aryee] Change: Provider activated new towers.
Cellular South Licenses, LLC	Mobile Wireless	Data Added to Statewide Inventory	4/12/2010	[FEB-19-13 Frank Aryee] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
CenturyLink	DSL	Data Added to Statewide Inventory	12/4/2009	[FEB-19-13 Frank Aryee] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Charter Communications, Inc.	Cable	Data Added to Statewide Inventory	12/15/2009	[FEB-05-13 Frank Aryee] Changes and/or Corrections: possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Frontier Communications Corporation	DSL	Data Added to Statewide Inventory	1/22/2010	[MAR-12-13 Frank Aryee] Change: Provider activated new DSLAMs.
Info-Ed Inc	Fixed Wireless	Data Added to Statewide Inventory	2/9/2010	[MAR-12-13 Frank Aryee] Change: Provider activated four new towers.
James Cable LLC	Cable	Data Added to Statewide Inventory	1/11/2010	[JAN-17-13 Frank Aryee] Change: Provider expanded service to other areas. DBA name is now Mediastream.
JTM Broadband	Fixed Wireless	Data Added to Statewide Inventory		[FEB-13-13 Frank Aryee] Change: Provider activated four new towers. Download speeds were also upgraded to speed tier 5.
Ken-Tenn Wireless, L.L.C.	Fixed Wireless	Data Added to Statewide Inventory	1/25/2010	[MAR-12-13 Frank Aryee] Change: Provider activated four new towers.
Leap Wireless International, Inc.	Mobile Wireless	Data Added to Statewide Inventory	4/6/2010	[FEB-08-13 Frank Aryee] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Mediacom Southeast LLC	Cable	Data Added to Statewide Inventory	1/12/2010	[MAR-12-13 Frank Aryee] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
MegaPath Corporation	DSL	Data Added to Statewide Inventory	2/15/2010	[MAR-12-13 Frank Aryee] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Millington CATV, Inc.	Cable	Data Added to Statewide Inventory	10/19/2009	[JAN-29-13 Frank Aryee] Change: Provider expanded service to additional areas in Tipton County.
Millington CATV, Inc.	DSL	Data Added to Statewide Inventory	10/19/2009	[JAN-29-13 Frank Aryee] Change: Provider removed some coverage in Fayette and Haywood Counties and expanded service to additional areas in Tipton County.
North Central Communications	DSL	Data Added to Statewide Inventory	2/5/2010	[MAR-08-13 Frank Aryee] Change: Provider expanded DSL coverage to include areas covered by its Fiber network. Download speeds has also been upgraded to tier 7.
North Central Communications	Fiber	Data Added to Statewide Inventory	2/5/2010	[MAR-12-13 Frank Aryee] Change: Provider activated new fiber service.

Skycasters	Satellite	Data Added to Statewide Inventory	10/16/2012	[MAR-14-13 Frank Aryee] Correction: Initial submission of provider's coverage, but they were in service previously.
Sprint Nextel Corporation	Mobile Wireless	Data Added to Statewide Inventory	1/14/2010	[FEB-13-13 Frank Aryee] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
T-Mobile USA, Inc.	Mobile Wireless	Data Added to Statewide Inventory	1/8/2010	[FEB-15-13 Frank Aryee] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
TDS Telecommunications Corporation	DSL	Data Added to Statewide Inventory	1/27/2010	[MAR-01-13 Frank Aryee] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
TDS Telecommunications Corporation	Fiber	Data Added to Statewide Inventory	1/27/2010	[MAR-01-13 Frank Aryee] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
TEC of Jackson, Inc	Fiber	Data Added to Statewide Inventory	7/29/2010	[MAR-12-13 Frank Aryee] Change: Provider activated new fiber service.
TEC of Jackson, Inc	Fiber	Data Added to Statewide Inventory	7/29/2010	[MAR-12-13 Frank Aryee] Change: Provider activated new fiber service.
TEC of Jackson, Inc	DSL	Data Added to Statewide Inventory	7/29/2010	[MAR-05-13 Sarah Finne] Change: Network expansion (provider installed an additional remote terminal). Also, coverage was recreated to account for multiple speed tiers.
TEC of Jackson, Inc	DSL	Data Added to Statewide Inventory	7/29/2010	[MAR-04-13 Sarah Finne] Change: Provider upgraded infrastructure and can now offer tier 7 download speeds in select areas. Also, dataset has been reprocessed, therefore a small change in coverage is present (a few tiny areas removed).
Time Warner Cable Inc.	Cable	Data Added to Statewide Inventory	12/21/2009	[MAR-12-13 Frank Aryee] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Twin Lakes Telephone Cooperative Corporation	DSL	Data Added to Statewide Inventory	1/14/2010	[MAR-08-13 Frank Aryee] Change: Some areas were removed from the existing coverage. Also, Provider upgraded infrastructure and can now offer tier 7 download speeds.
Twin Lakes Telephone Cooperative Corporation	Fiber	Data Added to Statewide Inventory	1/14/2010	[MAR-12-13 Frank Aryee] Change: Provider activated new fiber service.
Twin Lakes Telephone Cooperative Corporation	Fixed Wireless	Data Added to Statewide Inventory	1/14/2010	[MAR-12-13 Frank Aryee] Change: Provider activated two new towers and discontinue use of previous tower.
Ultranet High-Speed Internet	Fixed Wireless	Data Added to Statewide Inventory	2/23/2010	[MAR-11-13 Frank Aryee] Change: Additional tower was added with a higher speed at tier 6 download.
United States Cellular Corporation	Mobile Wireless	Data Added to Statewide Inventory	2/15/2011	[JAN-29-13 Frank Aryee] Changes and/or Corrections: possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Verizon Communications, Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/14/2009	[FEB-11-13 Frank Aryee] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
West Kentucky and Tennessee Telecommunications Cooperative Inc	DSL	Data Added to Statewide Inventory	2/8/2013	[MAR-12-13 Frank Aryee] Change: Provider added coverage and also upgraded infrastructure and can now offer tier 6 download speeds.
West Kentucky and Tennessee Telecommunications Cooperative Inc	Fiber	Data Added to Statewide Inventory	2/8/2013	[MAR-12-13 Frank Aryee] Change: Provider removed coverage in Gibson County and expanded service in Henry County.
Ardmore Telephone Company Inc	Backhaul	Backhaul Provider Only Processing Complete	2/16/2010	
Athena Broadband	Backhaul	Backhaul Provider Only Processing Complete		
Conterra Ultra Broadband, LLC	Backhaul	Backhaul Provider Only Processing Complete		
Level 3 Communications, LLC	Backhaul	Backhaul Provider Only Processing Complete	12/14/2009	
MegaPath Corporation	Backhaul	Backhaul Provider Only Processing Complete	2/15/2010	
T-Mobile USA, Inc.	Backhaul	Backhaul Provider Only Processing Complete	1/8/2010	
Bristol Tennessee Essential Services	Fiber	Speed Only Update; Data Processing Complete	9/1/2010	[FEB-18-13 Frank Aryee] Change: Provider upgraded infrastructure and can now offer tier 11 download and upload speeds.
Celina Cable Communications, Inc.	Cable	Speed Only Update; Data Processing Complete	1/15/2010	[FEB-06-13 Frank Aryee] Change: Provider upgraded infrastructure and can now offer tier 7 download speeds.
Hughes Network Systems, LLC	Satellite	Speed Only Update; Data Processing Complete	2/5/2010	[MAR-08-13 Frank Aryee] Change: Provider upgraded infrastructure and can now offer tier 7 download speeds.
Morristown Utilities Commission	Fiber	Speed Only Update; Data Processing Complete	3/25/2010	[JAN-16-13 Frank Aryee] Change: Provider upgraded infrastructure and can now offer tier 10 download speeds.
Tennessee Wireless, LLC	Fixed Wireless	Speed Only Update; Data Processing Complete		[MAR-14-13 Frank Aryee] Change: Provider upgraded infrastructure and can now offer tier 7 download speeds. Provider also acquired OrbWireless.net; that service area has been added to the Tennessee Wireless coverage.

Tullahoma Utilities Board	Fiber	Speed Only Update; Data Processing Complete		[FEB-08-13 Frank Aryee] Change: Provider upgraded infrastructure and can now offer tier 10 upload speeds.
TNWEB, LLC	Fixed Wireless	No Update-Estimated Coverage Submitted for Non-Participating Provider		
Wisper, LLC	Fixed Wireless	Estimated Coverage Submitted for Non-Participating Provider	2/22/2011	[MAR-13-13 Frank Aryee] Correction: Provider has not participated to date; coverage submitted was estimated by CN.
Comcast Cable Communications, LLC	Cable	Approval for Update Not Received – Data Still Submitted	12/7/2009	[MAR-01-13 Frank Aryee] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Access Cable Television, Inc.	Cable	No Update to Provide		
AT&T Inc.	Backhaul	No Update to Provide	12/16/2009	
Aurora Cable TV	Cable	No Update to Provide	3/12/2010	
Beasley Wireless	Fixed Wireless	No Update to Provide	1/19/2010	
BreezeAir.net	Fixed Wireless	No Update to Provide	8/17/2010	
CenturyLink	Backhaul	No Update to Provide	12/4/2009	
Clearwire Corporation	Mobile Wireless	No Update to Provide	3/3/2010	
Columbia Power & Water Systems	Cable	No Update to Provide		
DeKalb Telephone Cooperative, Inc.	DSL	No Update to Provide	2/24/2010	
DeKalb Telephone Cooperative, Inc.	Fiber	No Update to Provide	2/24/2010	
DeltaCom, Inc.	Backhaul	No Update to Provide	2/16/2010	
ECSIS.NET	Fixed Wireless	No Update to Provide	10/29/2009	
Electric Power Board for the City of Chattanooga	Fiber	No Update to Provide		
ETC Communications, LLC	Cable	No Update to Provide	10/14/2009	
High Country Online LLC	Fixed Wireless	No Update to Provide	3/4/2010	
Highland Telephone Cooperative, Inc.	DSL	No Update to Provide	3/14/2010	
Loretto Telephone Company, Inc.	DSL	No Update to Provide	3/16/2010	
NetEase	Fixed Wireless	No Update to Provide	2/3/2010	
Planet Connect Internet	Fixed Wireless	No Update to Provide		
Pulaski Electric System	Fiber	No Update to Provide	12/30/2009	
QuickRelay Wireless Communications	Fixed Wireless	No Update to Provide		
Skyline Telephone Membership Corporation	Backhaul	No Update to Provide	2/2/2010	
Skyline Telephone Membership Corporation	Fiber	No Update to Provide	2/2/2010	
Spacenet, Inc.	Satellite	No Update to Provide		
Sprint Nextel Corporation	Backhaul	No Update to Provide	1/14/2010	
Surfmore.Net, Inc.	Fixed Wireless	No Update to Provide	1/25/2010	
TDS Telecommunications Corporation	Backhaul	No Update to Provide	1/27/2010	
TEC of Jackson, Inc	Backhaul	No Update to Provide	7/29/2010	
TEC of Jackson, Inc	Backhaul	No Update to Provide	7/29/2010	
TEC of Jackson, Inc	Backhaul	No Update to Provide	7/29/2010	
TEC of Jackson, Inc	DSL	No Update to Provide	7/29/2010	
tw telecom of tennessee, llc	Backhaul	No Update to Provide	3/31/2010	
ViaSat, Inc.	Satellite	No Update to Provide	1/8/2010	
WideOpenWest Finance, LLC	Cable	No Update to Provide		[MAR-14-13 Frank Aryee] Change: WideOpenWest (WOW) acquired the Knology service area in Tennessee, so data is now being submitted under the WOW name and FRN.
XO Communications, LLC	Backhaul	No Update to Provide	2/12/2010	
Zito Midwest, LLC	Cable	No Update to Provide	2/17/2011	
Ben Lomand Rural Telephone Coop., Inc.	DSL	No Update Provided – Use Last Submission Data	10/21/2009	
Ben Lomand Rural Telephone Coop., Inc.	Fiber	No Update Provided – Use Last Submission Data	10/21/2009	
Bledsoe Telephone Cooperative Inc	DSL	No Update Provided – Use Last Submission Data	1/20/2010	
Clarksville Department of Electricity	Fiber	No Update Provided – Use Last Submission Data		
CRU Enterprises, Inc.	Fixed Wireless	No Update Provided – Use Last Submission Data	2/4/2010	
Fayetteville Public Utilities	Cable	No Update Provided – Use Last Submission Data		
InfoStructure Inc.	Cable	No Update Provided – Use Last Submission Data	10/2/2009	
Iris Networks	Backhaul	No Update Provided – Use Last Submission Data	1/5/2010	
Jackson Energy Authority	Fiber	No Update Provided – Use Last Submission Data	3/17/2010	
Monster Broadband, Inc.	Fixed Wireless	No Update Provided – Use Last Submission Data	11/6/2009	[MAR-25-13 Ashley Hitt] Change: Provider acquired iGiles.net; that service area has been added to the Monster Broadband coverage.
Pickwick Cablevision, Inc.	Cable	No Update Provided – Use Last Submission Data		
Softek, Inc.	Fixed Wireless	No Update Provided – Use Last Submission Data	1/14/2010	[MAR-18-13 Frank Aryee] Provider now declines to participate in the mapping program, so previous dataset is being submitted.
Spirit Broadband	Cable	No Update Provided – Use Last Submission Data	3/29/2010	
TELE-PAGE Inc.	Fixed Wireless	No Update Provided – Use Last Submission Data	1/26/2010	
Trenton TV Cable Company	Cable	No Update Provided – Use Last Submission Data		
United Telephone Company, Inc.	Fiber	No Update Provided – Use Last Submission Data	2/25/2010	

United Telephone Company, Inc.	DSL	No Update Provided – Use Last Submission Data	2/25/2010	
Wave2Wave Communications Inc.	Backhaul	No Update Provided – Use Last Submission Data	4/28/2010	
Windstream Communications	Backhaul	No Update Provided – Use Last Submission Data		
Zayo Group, LLC	Backhaul	No Update Provided – Use Last Submission Data		
Aurora Cable TV	Fixed Wireless	Solicited Initial Data	3/12/2010	
Windstream Communications	Backhaul	Solicited Initial Data		
Highland Telephone Cooperative, Inc.	Fiber	Other	3/14/2010	[MAR-14-13 Frank Aryee] Provider indicated that the project is underway and is scheduled to be completed by Q3 2014, with anticipated speeds up to 20 mbps.
Birch Communications, Inc.	Backhaul	Refused to Participate		[JAN-31-13 Erin Flournoy] Connected Tennessee engineering representative received this message via e-mail from provider stating their company declines to participate.
Birch Communications, Inc.	DSL	Refused to Participate		[JAN-31-13 Erin Flournoy] Connected Tennessee engineering representative received this message via e-mail from provider stating their company declines to participate.
Trinity Communications LLC	Cable	Non-Responsive to Multiple Attempts		In addition to multiple contact attempts made during previous mapping submission periods, 5 contact attempts were made this period.

OFFICIAL APRIL 2013 UPDATE SUBMISSION TO THE NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION UNDER THE STATE BROADBAND INITIATIVE GRANT PROGRAM FOR THE STATE OF TEXAS

April 1, 2013

TABLE OF CONTENTS

April 1, 2013

Ms. Anne W. Neville
SBI Grant Program Director
National Telecommunications and Information Administration
U.S. Department of Commerce
Room 4716
1401 Constitution Avenue, NW
Washington, DC 20230

Dear Ms. Neville:

As the State Broadband Designated Entity for Texas, please accept this submission from Connected Nation on behalf of the state of Texas' State Broadband Initiative (SBI) Grant Program, known as Connected Texas.

Connected Nation and Connected Texas congratulate the National Telecommunications and Information Administration (NTIA) and the Federal Communications Commission (FCC) on achieving the two-year anniversary of the National Broadband Map. Truly, now more than ever, the significance of complete and validated data through this effort is impacting lives in communities all across our great country. The Connected Texas program and its collective stakeholder community continue to be faithful and energized contributors, and we are proud to play such a part in forging the innovation economy of the twenty-first century.

The artifacts that comprise this submission should be found to be compliant with the April 1, 2013, deadline for the semi-annual data update and in accordance with the terms of the July 1, 2009, Notice of Funds Availability (NOFA) and all subsequent clarifications pertaining to delivery of state-level mapping of broadband service availability. This packet includes:

Inventory of Deliverables, Connected Texas: April 1, 2013

NOFA Requirement	Data Transfer Model	Data Description
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in Census Blocks of No Greater Than Two Square Miles in Area
Appendix A: 1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census Blocks Larger in Area Than Two Square Miles

Appendix A: 1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address
Appendix A: 3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points
Appendix A: 4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing
Appendix A: 4	n/a	Community Anchor Institutions-Narratives
VII.A.1(a)	n/a	Accuracy and Verification Report
n/a	DataPackage.xlsx	Worksheets of Contact Information, Record Count, and Provider Summary Table
n/a	n/a	List of Changes and Corrections to the Dataset
n/a	n/a	Non-Participating Provider (NPP) Narratives
n/a	n/a	Broadband Provider Roster and Participation Status

In addition, this data update submission should be found to be compliant with the additional program requirements instituted by the National Telecommunications and Information Administration since the time of the October 2012 SBI data submission for the Connected Texas program. Specifically, these new requirements are:

SBI Data Transfer Model

The submission of the broadband dataset for April 1, 2013, is contained within the SBI Data Transfer Model as released on the Grantee Workspace on December 14, 2012. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information on each provider as possible.

Additional Submission Guidance

On February 8, 2013, NTIA released new guidance regarding the processing of wireless data, for both fixed and mobile broadband providers. All wireless provider coverage records have been reviewed and are in compliance with this grantee guidance for this April 2013 submission period. Even providers that did not have an update for this submission cycle were reviewed and data reprocessed as necessary for those records that were not yet in compliance with the new guidance.

This submission continues to follow the speed technology guidance released by the Program Office on August 9, 2012, to review speed tier codes in correspondence with technology of transmission codes. In the October 2012 submission, descriptions were provided in the methodology paper that offered an explanation for any submitted technology of transmission and speed combinations that were outside of the expected value range. That

practice continues in this submission as technology and speed combinations are reviewed and scrutinized; any questionable information supplied by providers is reviewed more in depth with the provider to ensure the information is accurately captured or a proper explanation is provided as to why the speed information should be submitted as supplied even if it falls outside the expected value range.

This submission also includes narratives describing the data and coverage estimation of non-participating providers. While Connected Texas continues outreach to all providers prior to each submission period, the need to submit broadband service data for all providers regardless of their participation is evident as the SBI program continues into this seventh round of data submissions. The submission of this estimated broadband service area for providers that have not supplied data to Connected Texas is essential in being able to portray a more accurate depiction of the current broadband landscape.

This April 2013 semi-annual data update under the SBI Grant Program continues to demonstrate our dedication to implementing the joint purposes of the Recovery Act and the Broadband Data Improvement Act (BDIA) by gathering comprehensive and accurate state-level broadband mapping data, developing state-level broadband maps, aiding in the development and maintenance of the National Broadband Map, and undertaking statewide initiatives for broadband planning.

Broadband Service Availability — Provider Outreach and Verification

This data update submission under the SBI program includes datasets for 91.54 percent of the Texas provider community, or 184 of 201 total providers. There are 167 participating providers and 17 additional non-participating providers whose estimated coverage areas have been submitted. Of the 167 participating providers, 62 supplied an update to their network or coverage area(s), while 90 have reported no change. The remaining 15 represent providers who previously supplied data but were non-responsive in the April 2013 update effort; therefore, their previous dataset is being put forward as part of this compilation. A complete roster by provider depicting participation status and contact history is contained herein. Of the 17 providers that are not represented in the attached datasets, 16 have refused to participate in the voluntary program or were non-responsive to multiple contact attempts, and 1 provider is currently in some form of progress toward data submission but was not able to submit coverage areas at the time of this submission.

As the aforementioned roster and attached methodology documentation will attest, it is the collective opinion of the Connected Texas principals that all commercially reasonable efforts were made to account for 100 percent of the known Texas broadband provider community, pursuant to this semi-annual data update submission.

Connected Texas has also continued to perform broadband verification activities through several means. In addition to confirmation of service area(s) by each provider, Connected Texas conducts field validation efforts. To date, 164 (81.59 percent) providers have been validated through field verification activities. Additional details on verification activities are contained within the Field Validation Methodology.

The Connected Texas website, (www.connectedtx.org), continues to serve a prominent role in the outreach and data collection effort. This program asset provides a way for the general public to participate in the process by offering interactive tools for users to test their connection speed, submit broadband inquiries, or contact a program representative.

As an indicator of stakeholder penetration, the Connected Texas website encountered 5,831 unique visits during this reporting period (52,282 total to date for the life of the grant awarded on January 1, 2010. Additionally, this pronounced Web activity netted 12 broadband inquiries over this same reporting period (546 grant inception to date). The website also provides access to the My ConnectView™ interactive mapping application, which allows consumers and broadband providers to confirm or dispute the coverage represented on the broadband inventory map. These consumer-initiated actions are facilitated through the Connected Texas website and the Connected Texas interactive mapping tool (My ConnectView™) that offer the stakeholders the vehicles to provide information regarding availability in their respective service area, either in affirmation or contest of the reported data represented in the Connected Texas mapping artifacts. Since the initial data collection and release of corresponding maps, feedback in the form of broadband inquiries has allowed Connected Texas to identify additional areas that are in need of field validation, which is scheduled as soon as possible.

Community Anchor Institutions

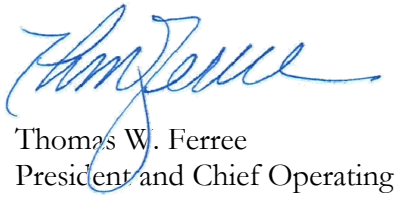
Connected Texas continues to make significant inroads to gather data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. This uptick in CAI data collection was further supported by NTIA's outreach to grantees reiterating the importance of this outreach. With the continued commitment of the Texas Department of Agriculture, we have continued to focus on a relationship-oriented approach with state-level agencies and organizations that generates more responses than general contact.

In conjunction with the Texas Department of Agriculture, outreach was conducted during this data update reporting period by Connected Texas to continue identification of existing, centralized sources for CAI connectivity data. Additionally, outreach was coordinated to distribute the CAI survey to institutions throughout the state through multiple methods including a customized online survey available on the Connected Texas website. Building on past success of the September 2012 Education Campaign, February 2013 was recognized as Public Safety Month where the public safety sector was the focus of CAI data collection, research, and public affairs outreach. Connected Texas has developed a number of new relationships with statewide associations, such as the Education SuperHighway, Technology for All, Austin FreeNet, Literacy Texas, and the Texas State Legislature, to promote the importance of broadband connectivity at anchor institutions and participation in this data collection process. The value of these relationships continues to impact the entire success of the Grant Program, and the CAI engagement is a logical extension of new and existing relationships. Connected Texas will continue to build upon these new relationships over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

From our work in Texas, as well as other states, we recognize the great value of this data to future collaboration efforts within the state as well as its value to the National Broadband Map. We plan to continue to bring best practices to the Connected Texas efforts, along with an investment of both human and technical resources required to reach our goal of increasing the data that is secured and reported as part of this process.

The Connected Texas program exists to improve data on the deployment and adoption of broadband services and to assist in the extension of broadband technology across all regions of the great state of Texas, as well as the United States and its territories through contribution to the National Broadband Map. We look forward to the continuing work ahead and improving upon our data collection methods.

Respectfully submitted,



Thomas W. Ferree
President and Chief Operating Officer
Connected Nation, Inc.

TEXAS COMMUNITY ANCHOR INSTITUTIONS METHODOLOGY

In this seventh reporting period of the SBI, Connected Texas, working in close coordination with the state of Texas, has established an ongoing mechanism for gathering data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. Since the October 2012 data submission, the CAI outreach process method has been modified to improve data collection. Specifically, the outreach process is a more focused sector-specific and relationship-oriented approach that generates more responses than general contact.

Connected Texas has continued to identify and process CAI data obtained through an ongoing statewide outreach campaign. Physical address information continues to be augmented through manual sourcing and geocoded by Connected Texas through Esri ArcGIS software.

Connected Texas continues to utilize a customized online survey hosted through SurveyMonkey, with a landing page on the Connected Texas website that was developed during the first reporting period. This survey, in combination with a customized data-gathering spreadsheet, was distributed on a regular basis to a targeted list of CAI throughout the state as well as organizations and agencies that work closely with the CAI. The distributions were completed with the support of the state client. Connected Texas will continue to use these data-gathering tools for future targeted outreach efforts throughout the coming months leading up to the next reporting period. These materials are customized to fit the CAI categories as defined in the SBI NOFA.

The survey can be accessed at this link: http://www.surveymonkey.com/s/2S72YFV

In addition to the survey, Connected Texas has developed a number of new relationships with statewide associations, such as the Education SuperHighway, Technology for All, Austin FreeNet, Literacy Texas, and the Texas State Legislature, to promote the importance of broadband connectivity at Community Anchor Institutions and participation in this data collection process. It is apparent that these relationships are beneficial to the entire success of the grant program, and the CAI engagement is a logical extension of new and existing relationships. Connected Texas will continue to build upon these new relationships over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

In addition to fostering and building relationships with state agencies, associations, and organizations, Connected Texas has also developed a sector-specific calendar that supports CAI outreach as well as research and communications efforts. This focused approach allows a corporate commitment to capturing CAI data in addition to developing meaningful sector-specific content. Since the October 2012 submission, the sector-specific approach included a month-long public safety campaign in February 2013. During this campaign, Connected Texas committed to improve relationships with key stakeholders, distribute survey requests to sector representatives, and provide sector-specific education through communications and webinar resources. Outreach to and survey of hospitals, local law enforcement, and fire stations helps build awareness and establishes a centralized database of key connectivity data for planning.

Connected Texas conducts significant research as part of an ongoing process to identify existing, centralized sources for CAI connectivity data. In tandem with these efforts to identify existing data, Connected Texas continues to identify key CAI contacts in an effort to distribute and promote the online survey and raise awareness of the importance of CAI broadband connectivity. Also, when possible, Connected Texas works with the Texas Department of Agriculture and the Texas Department of Education, to identify existing relationships that can support CAI outreach.

Connected Texas has an ongoing mission to educate CAI throughout the state on the importance of participating in the project. Participation by these institutions will raise awareness about the importance of broadband connectivity and the need to report the requested data for inclusion on the National Broadband Map.

The greatest challenge with collecting CAI data continues to be educating the CAI about the Connected Texas project as well as self-awareness of their own broadband connectivity (specifically upload and download speeds). Connected Texas will continue to research key CAI organizations and agency contacts in an effort to raise awareness of this project among CAI. When applicable, the Texas Department of Agriculture will continue to be briefed on the current CAI data and provided information so it can assist with outreach and promotion within the state.

A CAI summary of all processed and submitted data is provided below:

CAI Type	Total	Physical Address	Lat/Long	Technology of Transmission	Download Speed	Upload Speed
K-12 Schools	10953	10953	10507	113	2655	2652
Libraries	1197	1197	1188	108	264	104
Healthcare	870	870	851	97	179	97
Public Safety	4420	4420	3739	261	548	259
Higher Ed Institutions	448	448	427	36	106	35
Other Government	1507	1507	1105	471	102	54
Other Non-Government	21	21	13	5	5	5
Total	19416	19416	17830	1091	3859	3206

During the coming months, CAI data collection will be supported by regular reporting to the Connected Texas team. The CAI data is proving an invaluable resource to all components of the Connected Texas effort. The data identifies potential local champions, sector trends, and opportunities for improvement as well as opportunities to educate CAI not familiar with their current connectivity.

SBI Data Submission Methodology

The submission of the broadband dataset for April 1, 2013, is contained within the SBI Data Transfer Model and additional components as released on the Grantee Workspace on December 14,

2012. Connected Nation (CN) has reviewed all literature that relates to the release and use of this data transfer model and recognizes that it does not replace or dictate how data is stored, processed, or displayed for the state, as it is meant primarily as a means to transfer the broadband data from all states and territories and populate the National Broadband Map in a seamless fashion.
Connected Nation has complied with the following guidance documents published by NTIA:

- Technical Mapping Guide, as released on the Grantee Workspace on March 24, 2011, was followed to ensure the completeness and validity of the submission through completion steps and checklists, completing the DataPackage spreadsheet, uploading broadband datasets into the Data Transfer Model, and checking the dataset using the SBDD_CheckSubmission receipt process.
- Naming Conventions and Category of End User, as released on the Grantee Workspace on March 26, 2012, was followed to ensure the consistency of individual file and zip package naming.
- Wireless Data Processing Guidance, as sent to SBI grantees on February 8, 2013, was followed to ensure that all fixed and mobile wireless provider coverage records are submitted to NTIA as separate, closed polygons whenever there is a variation in any of the required fields.

In addition to the methodologies contained herein, the Changes and Corrections documentation, as well as the DataPackage.xls containing contact information, the data dictionary, and a provider summary table, the following feature classes are submitted within the SBI Data Transfer Model for the state of Texas.

Inventory of Deliverables, Connected Texas: April 1, 2013

NOFA Requirement	Data Transfer Model	Data Description
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in Census Blocks of No Greater Than Two Square Miles in Area.
Appendix A: 1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census Blocks Larger in Area Than Two Square Miles.
Appendix A: 1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address.
Appendix A: 3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points.
Appendix A: 4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing.

The provider data collected by CN on behalf of the state of Texas have been formatted per the given specifications and uploaded into the appropriate feature classes of the SBI Data Transfer Model. Wireline availability is contained within census blocks and road segments, wireless availability is contained as polygons of coverage areas, and middle-mile connections and Community Anchor

Institutions are contained as point data. All speed data is contained at the census block, road segment, or wireless polygon level of availability. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information as possible.

Connected Nation has continued outreach to satellite providers on their availability, technology, and speed information, but granular coverage is not yet available. Submitted within the wireless feature class are the satellite companies providing service to Texas as a polygon of the state boundary. Efforts will continue to collect, process, or otherwise create more granular satellite data based on availability analyses and guidance received from NTIA. Process development continues as well to be able to create more granular satellite coverage based on satellite equipment positioning and geographic inputs.

DATASETS FOR IN-KIND MATCH

All datasets used in this project have been contributed in-kind. Datasets used by the project to date and their respective in-kind contribution value are as follows:

- Commission on State Emergency Communications Regional Planning Commission's input - $7,395
- District & Municipal Public Safety Answering Point data - $1,419
- K-12 School address data - $26,895
- Texas ISD Superintendents and Technology Coordinators - $3,768
- Texas Water Board Orthoimagery - $465,000
- Texas Workforce Commission IT - $82
- Workforce Solutions data - $770

TEXAS FIELD VALIDATION METHODOLOGY

CN focused a portion of its time on specific validation processes such as:

- conducting random spectrum analysis studies throughout the state using an Avcom PSA-37-XP spectrum analyzer;
- conducting mobile speed tests throughout the state using an iPhone, Android (or other smart phone) as well as provider-specific aircards (Sprint 3G/4G, Clearwire et al);
- identifying pre-selected, provider-submitted wireless transmit tower sites and cross-referencing data about that tower against the Federal Communications Commission (FCC) databases such as Antenna Structure Registration and/or the Universal Licensing System;
- cross-referencing Federal Registration Number data against available FCC Form 477 data as well as the FCC **CO**mmission **RE**gistration **S**ystem (CORES);
- validating provider submitted data (for example: latitude/longitude) using a handheld Garmin eTrex Summit GPS unit or GPS enabled software such as Microsoft *Streets & Trips*;

- locating physical wire-line attributes (such as Central Offices, Remote Terminals, CATV plant, etc.) and comparing them against provider submitted data; and
- conducting on-net and off-net speed tests using the FCC portal at http://www.broadband.gov/qualitytest/about/ or using the Ookla Net Metrics enabled speed test utility located on each of CN's program specific websites.

Additionally, CN cross-referenced numerous public documents in order to ensure that all known broadband providers were located and contacted. This included searching membership logs from trade associations (WISPA, WCAI, PCIA, etc.), the Cable Television Fact Book, Public Utility Commission records, Public Service Commission records, Chamber of Commerce, etc.

To date, Connected Nation's staff conducted on-site validation tests in Texas on the following providers: ADT Systems Inc. (d.b.a. Rural Texas Broadband); Alamo Broadband; Aledo Broadband; Alenco Communications, Inc.; Allegiance Communications; Alpheus (d.b.a. Aspen Communications); AMATechTel; Anvil Communications; AT&T, Inc.; AwesomeNet, Inc.; Baja Broadband; Basin 2 Way Radio, Inc.; Basin Broadband, Inc.; Bee Creek; Big Bend Telephone Company, Inc.; Blossom Telephone; Border to Border Communications, Inc.; Brazoria Telephone Company (d.b.a. Coastal Link); Broadband Data Services of Texas LLC; Broadcomm.US; Broadwaves; Buffalo Cable TV; Burcham Solutions (d.b.a. DET-Com); Cable One, Inc.; Cameron Telephone Company LLC; Cap Rock Telephone Cooperative, Inc.; Celltex Networks, LLC; Central Texas Cable Partners, Inc.; Central Texas Telephone Cooperative, Inc.; Central Texas Telephone Investments LP; CentroVision; CenturyLink; Cequel Communications (also d.b.a. Cebridge, Suddenlink); Charter Communications; CKS Wireless, Inc.; Clearwire Corporation; Coleman County Telephone Cooperative LLC; Colorado Valley Telephone Cooperative LLC; Comcast Cable Communications LLC; Community Telephone Company, Inc.; Consolidated Communications; Conterra Communications; Cumby Telephone Company, Inc.; DCT Texas.Net; Dell Telephone Cooperative, Inc.; Digital Passage; Digitex.com; East Texas Broadband; East Texas Cable; East Texas DSL; East Texas WiFi; Eastex Telephone Cooperative, Inc.; ECTISP; Electra Telephone Company; eNet; ENMR Telephone Cooperative, Inc. (d.b.a. ENMR Plateau Communications, Inc.); ERF Wireless; ETAN Industries; Etex Communications LP; ETS Cablevision Company, Inc.; Farm to Market Broadband LP; Fidelity Communications; Five Area Telephone Company, Inc.; Ganado Telephone Company, Inc.; Gecko Inter.net; GEUS; Gower Computer Support, Inc.; GoZoe Wireless, LLP; Grande Communications Network LLC; Grayson CableRocket LLC; Greasy Bend Ventures, Inc. (d.b.a. Live Air Networks); GTEK Communications; Guadalupe Valley Communications Systems; GVEC.net; Helmsco/CentralLink; Hillcountry Network Systems; Hill Country Telephone Cooperative; Hometown Computing; Iguana Net; Indian Creek Internet; Industry Telephone Company; Internet America; JAB Wireless (also d.b.a. Dot 11 Networks, Partnership Broadband, Element Networks, and KeyOn Communications, Inc.); James Cable (d.b.a. CommuniComm); La Ward Telephone Exchange, Inc.; Lake Livingston Telephone Company; Leap Wireless International, Inc.; Level 3 Communications; Livingston Telephone Company, Incorporated; LV WiFi; McDonald Group; Media Cottage (d.b.a. VOWNet); Mexus Communications; Mid-Plains Rural Co-op, Inc.; Millenium Telecom; NDemand; NetWest Online, Inc.; Neu Ventures, Inc.; New Source Broadband; Nortex Communications; North Texas Broadband LLC; North Texas Cellular, Inc.; North Texas Telephone Company; Northland Communications; NTS Communications; Our Town Internet; Panhandle Telephone Cooperative,

Inc.; Pathwayz; Peoples Communication; Phantom Wave (d.b.a. Argon Technologies); Poka Lambro Telephone Cooperative, Inc.; Promptwireless LLP; Ranch Wireless; RB3 LLC; Ridgewood Cable; Rioplex Wireless Ltd.; Riviera Telephone Company, Inc.; Rock Solid Internet & Telephone; Rodzoo Wireless; Santa Rosa Telephone Cooperative, Inc.; Skynet Communications; Skynet Country Online; Smithville System; SOS Communications; South Plains Telephone Cooperative, Inc.; South Texas Internet; Southwest Arkansas Telephone Cooperative, Inc.; Southwest Texas Telephone Company; Speed of Light Broadband, Inc.; Sprint Nextel Corporation; Starnet; Stelera Wireless LLC; Tatum Telephone; Taylor Telephone Cooperative, Inc.; Telecom Cable LLC; Terral Telephone Company (d.b.a. Wavelinx); TGN Cable; Texas Broadband, Inc.; Texas CellNet; Texas Wireless Internet; Texhoma Wireless; TheSPECnet (also d.b.a. ELC Internet Services, Inc.); TierOne Converged Networks, Inc.; Time Warner Cable, Inc.; TISD; T-Mobile USA, Inc.; Totelcom Communications, Inc.; TXOL Internet; Valley Telephone Cooperative, Inc.; Verizon Southwest, Inc.; Versalink Enterprises; VRFutureNet; Webfire Communications; WEHCo Video (d.b.a. Kilgore Video, Kilgore Cable); West Tex Connect; West Texas Rural Telephone Cooperative; Wes-Tex Telecommunications Ltd.; Wharton County Electric Cooperative, Inc.; Windstream Communications; XIT Telecommunications & Technology Ltd.; Zeecon Internet; Zip Link; Zito Midwest LLC (d.b.a. Galaxy Cable and Windjammer Communications); and Zulu Internet.

In addition to the field verification tests that have been conducted, Connected Nation has also conducted work in the field to collect information for the non-participating providers, Gecko Inter.net, Indian Creek Internet, Media Cottage Inc. (d.b.a.VOWnet), Terral Telephone Company, and WesTex Connect, which, by nature of the methodology required for this collection, are also included in the above list.

From program initiation through this reporting period, CN has completed in-the-field validation testing against 164 companies (out of a universe of 201 viable providers) totaling 81.59 percent within the state of Texas. This percentage also considers the non-participating provider records submitted to NTIA as may be contained herein (see "Data Submission and Coverage Estimation of Non-Participating Provider" below).

CN has also continued to review provider datasets for accurate speed information, platform listings, and other intricacies that may fall outside of the standard SBI Data Transfer Model parameters, as published on the NTIA Grantee Workspace on December 14, 2012. Any providers whose submitted coverage and attributes are anticipated to come into question have been further reviewed and confirmed; details on a case-by-case basis are presented below.

Buffalo Cable TV
Issue: Technology of transmission code 40 with maximum advertised download speed in tier 5, lower than expected value range for the technology.
Resolution: Provider representative confirmed that service area is DOCSIS 3.0, but lower speeds are still advertised and in use.

Cequel Communications (Suddenlink)
Issue: Technology of transmission code 40 with maximum advertised download speed in tiers 7 and 8, lower than expected value range for the technology.
Resolution: Provider representative confirmed that DOCSIS 3.0 is indeed in use, but speeds have not been turned up higher at this time.

Millennium Telcom, LLC
Issue: Technology of transmission code 40 with maximum advertised download speed in tier 8, lower than expected value range for the technology.
Resolution: Use of DOCSIS 3.0 throughout service area was confirmed, even at lower speeds.

Nortex Communications
Issue: Technology of transmission code 40 with maximum advertised download speed in tier 7, lower than expected value range for the technology.
Resolution: Confirmed use of DOCSIS 3.0 throughout service area; however, speeds are kept lower currently to be backwards compatible.

North Texas Broadband, LLC
Issue: Technology of transmission code 40 with maximum advertised download speed in tier 6, lower than expected value range for the technology.
Resolution: Use of DOCSIS 3.0 throughout service area was confirmed, even at lower speeds.

Time Warner Cable LLC
Issue: Technology of transmission code 41 with maximum advertised download speed in tier 8, higher than expected value range for the technology.
Resolution: Provider website advertises 30 Mbps service; screenshot below.

DATA SUBMISSION AND COVERAGE ESTIMATION OF NON-PARTICIPATING PROVIDERS (NPP)

As part of its ongoing broadband mapping efforts, CN has developed a series of processes with the goal of submitting coverage estimation mapping data to NTIA for every known and qualifying last-mile broadband provider, regardless of platform type (cable modem, DSL, fixed wireless, etc.). Appendix A presents full reports on the estimated broadband service territory for the providers in this state that have either been non-responsive or that have refused to participate in the SBI

mapping initiative as of April 2013. These coverage estimation reports are for non-participating providers whose data has not been previously submitted to NTIA in past mapping cycles.

The section below provides a summary of the status of CN's outreach and findings on all non-participating provider coverage for the April 2013 SBI submission.

AMA TechTel
The coverage estimation for AMA TechTel was not updated from the previous submission in October 2012. The full white paper containing the most recent coverage estimation for this provider can be found within the October 2012 submission to NTIA.

Broadwaves
The coverage estimation for Broadwaves was not updated from the previous submission in October 2012. The full white paper containing the most recent coverage estimation for this provider can be found within the October 2012 submission to NTIA.

CKS Wireless
The coverage estimation for CKS Wireless was updated based on 6 new tower locations. The full white paper containing the most recent coverage estimation for this provider can be found within the October 2012 submission to NTIA.

East Texas Broadband
The coverage estimation for East Texas Broadband was not updated from the previous submission in October 2012. The full white paper containing the most recent coverage estimation for this provider can be found within the October 2012 submission to NTIA.

East Texas Cable Company
The coverage estimation for East Texas Cable Company was not updated from the previous submission in October 2012. The full white paper containing the most recent coverage estimation for this provider can be found within the October 2012 submission to NTIA.

Gecko Inter.net
Coverage for this NPP is being submitted for the first time; please find a white paper on provider outreach and coverage estimation in Appendix A.

Go Zoe Wireless
The coverage estimation for Go Zoe Wireless was updated based on 3 new tower locations. The full white paper containing the most recent coverage estimation for this provider can be found within the October 2012 submission to NTIA.

Indian Creek Internet
Coverage for this NPP is being submitted for the first time; please find a white paper on provider outreach and coverage estimation in Appendix A.

Skynet Communications
The coverage estimation for Skynet Communications was not updated from the previous submission in October 2012. The full white paper containing the most recent coverage estimation for this provider can be found within the October 2012 submission to NTIA.

StarNet Online
The coverage estimation for StarNet Online was not updated from the previous submission in October 2012. The full white paper containing the most recent coverage estimation for this provider can be found within the October 2012 submission to NTIA.

Telecom Cable
The coverage estimation for Telecom Cable was not updated from the previous submission in October 2012. The full white paper containing the most recent coverage estimation for this provider can be found within the October 2012 submission to NTIA.

Terral Telephone Company
Coverage for this NPP is being submitted for the first time; please find a white paper on provider outreach and coverage estimation in Appendix A.

The SPEC-Net, Inc.
The coverage estimation for the SPEC-Net, Inc. was not updated from the previous submission in October 2012. The full white paper containing the most recent coverage estimation for this provider can be found within the October 2012 submission to NTIA.

VOWnet
Coverage for this NPP is being submitted for the first time; please find a white paper on provider outreach and coverage estimation in Appendix A.

VRFutureNet
The coverage estimation for VRFutureNet was not updated from the previous submission in October 2012. The full white paper containing the most recent coverage estimation for this provider can be found within the October 2012 submission to NTIA.

WesTex Connect Internet
Coverage for this NPP is being submitted for the first time; please find a white paper on provider outreach and coverage estimation in Appendix A.

Zulu Internet
The coverage estimation for Zulu Internet was updated based on 2 new tower locations. The full white paper containing the most recent coverage estimation for this provider can be found within the October 2012 submission to NTIA.

PROVIDER VALIDATION METHODOLOGY

Broadband providers maintain their service area data in many different formats, all in varying levels of complexity and granularity. In order to ensure that the data required by the NTIA is standardized across all providers and that it is as accurate as possible, CN translates and formats the data that providers are able to supply into a GIS shapefile and produces maps for the provider to review. The resulting map(s) and review process allow for providers to see their service area in a geographic format – for some providers, this is the first time they have seen maps of their broadband service area. Having the mapped service area allows providers to quickly identify any issues that appear in the data representation, whether the issue is in the data translation into a GIS format or from the original data collection and submission. Often data is provided from various sources and through the review and revision process, local engineers who operate the networks and work in the field are able to ensure that the tabular data that has been submitted is accurate and represents the real-world network extent. Any issues in how the service area is represented on the map(s) are remedied by CN, whether they are additions, removal of service, or any other revisions. Revised maps of service area representations are sent to the provider for review and approval; CN will revise data and return maps as many times as necessary until the provider is in agreement that the map represents their service area as accurately as possible. Once the review process has been completed and final approval of the data is provided, the data is deemed ready for NTIA submission.

Once the data collection has been aggregated at a statewide level, static maps of statewide and county-level availability are produced and made publicly available. In addition, consumers can visit the interactive online tool, My ConnectView, to create customized views of broadband service areas and analyze corresponding demographic information. Leveraging broadband service data on various platforms allows for public users, providers, and other stakeholders to review, scrutinize, and provide feedback on the represented data. This feedback becomes a validation method in itself, as consumers submit inquiries to CN either affirming where service is not available or identifying areas where broadband service is shown on the map, but in actuality is not available. This allows for a follow-up to providers regarding revisions to the data as it is represented; it also allows for CN to identify locations where on-site visits may be necessary to complete field validation of available services. Public feedback on all forms of mapping products serves as a localized validation method for provider-supplied information and allows CN to resolve inaccuracies as they are identified to ensure that only the highest quality information is provided to stakeholders.

Additionally, non-participating provider narratives that were submitted in previous mapping cycles are subjected to the same level of scrutiny. Occasionally, a provider may elect to voluntarily participate (thus eliminating the need for future data estimation activities in the field). However, more often than not, the NPP narrative is updated with a combination of data gleaned from the provider's website, data obtained through FCC research and/or data collected/verified in the field by a CN staff engineer.

Estimates derived from provider-validated data indicate that approximately 1.24 percent of Texas households do not have terrestrial fixed broadband service available, and approximately 0.09 percent of Texas households have neither mobile nor fixed broadband service available.

Within rural areas of the state, results derived from provider-validated data indicate that approximately 3.71 percent of rural Texas households do not have terrestrial fixed broadband service available, and approximately 0.27 percent of rural Texas households have neither mobile nor fixed broadband service available. Please note that the availability estimates presented are based on Census 2010 household information.

The estimates above, in accordance with NTIA's definition of available broadband service as specified in the SBI NOFA, include broadband service with download speeds of at least 768 Kbps and upload speeds greater than 200 Kbps.

In addition, due to the nature of the SBI data collection methodology as defined by the NTIA and based on both census block geographic units and street segment data, the estimates of broadband availability derived from provider-validated data may include an overstatement of the actual number of households with broadband availability. Under the census block-based data collection method, a provider will typically report broadband availability for an entire census block whether its network is present across the whole or only a subset of that census block. This potential overestimation at the census block level can be amplified as the data is aggregated across the entire state.

WIRELESS METHODOLOGY

Broadband Service Availability in Provider's Service Area
Wireless Services Not Provided to a Specific Address

Data solicited from a fixed wireless provider to create propagation models include, but are not limited to:

1. The name of the structure.
2. Whether the transmitting device is operational or proposed.
3. The maximum advertised downstream speed, the maximum advertised upstream speed.
4. The typical downstream speed, the typical upstream speed (peak periods for both).
5. The frequency range of spectrum being used (as prescribed by NTIA). This may include (but is not limited to) spectrum authorizations identified within the Federal Communications Commission (FCC) Universal Licensing System (ULS) database or located on the FCC's Spectrum Dashboard. This research often proves to be exceptionally effective when estimating the coverage area of an NPP.
6. The primary population center(s) being served (for geopolitical boundary reference).
7. The physical address of the transmit site (in the event latitude/longitude is unavailable from the provider this allows a quick reference point for geocoding).
8. Latitude in either Degrees, Minutes, and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
9. Longitude in either Degrees, Minutes and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).

10. Antenna pattern (e.g. omnidirectional, 180°, 120°, 90°, etc.).
11. Azimuth of antenna (e.g. 360° with magnetic declination if known).
12. Approximate transmit radius (in feet, miles, or kilometers).
13. Polarity of transmit antenna (Vertical or Horizontal).
14. Transmit antenna gain (in dBi).
15. Line loss (applicable only to providers using coax, heliax, waveguide or other forms of cabling – excludes power-over-Ethernet devices).
16. Mechanical and/or Electrical beam tilt (if applicable).
17. Equipment Manufacturer (allows easy cross-reference against manufacturer's specification sheet).
18. Power output of the transmitting device (if unknown, FCC standards or manufacturer specifications are applied).
19. AMSL at base of tower site.
20. Antenna centerline AGL (height of antenna above ground level measured at the centerline of the actual antenna).
21. Foliage factors (Evergreens/Deciduous and percent of ground cover).
22. Ground Clutter (primarily used in rural areas to account for foliage and in metropolitan areas to account for types and heights of buildings if known).
23. Average gain of receive antenna.
24. Receive antenna is estimated at height above average terrain (HAAT) of 6.2 meters/20 feet.
25. Federal Registration Numbers (if applicable) which may allow opportunities to cross-reference and/or obtain additional data from the FCC's ULS and the **CO**mmission **RE**gistration **S**ystem.

Propagation modeling combines scientific data and empirical mathematical formulation for the characterization of radio wave propagation as a function of frequency, distance, and other conditions. Propagation software(s) typically use the Irregular Terrain Model (also known as Longley-Rice) of radio propagation for frequencies between 20 MHz and 20 GHz. This model is based on electromagnetic theory and statistical analyses of the combination of terrain features and radio measurements, then predicting the median attenuation of a radio signal as a function of distance and the variability of the signal in time and in space. For metropolitan areas, the software can typically be adjusted to use the Okumura-Hata model, which accounts for predicting the behavior of cellular transmissions in areas where buildings are the primary obstructions. The resulting product from either model depicts a graphical illustration of the theoretical propagation characteristics of a selected frequency range based on defined variables (receiver sensitivity of the home/mobile device, foliage factor, and digital elevation terrain input).

After converting propagation models into a geospatial format, additional processing is completed to remove the small pixels representing service present in the resulting dataset. These areas are initially created based on the parameters entered in the software from the provider equipment information, the underlying data parameters of elevation, hill shade, etc., and the limitations of the software itself

to display a broadband service area as accurately as possible. Generally, these random pixel striations appear as a result of signal levels reaching the highest elevated points within the prescribed radius. Typically, while this pixilation anomaly shows legitimate areas where signals can be received, these highly elevated points may have exceedingly sparse populations or are entirely void of population. As a result, and congruent to the *Wireless Technology Methodologies and Business Logic* white paper submitted to NTIA on January 20, 2011, all independent pixels representing service that are less than 0.125 square miles in area have been removed from the geospatial representation of each wireless provider.

BROADBAND INQUIRIES METHODOLOGY

CN collects consumer feedback in the form of broadband inquiries (BBIs). These inquiries represent any type of communication received from the public regarding broadband service. Once BBIs are received across the state, this information is overlaid with the broadband availability information which was collected through the SBI program. This allows for a real-world comparison of the broadband landscape to the information received from broadband inquiries. Consumers submitting these inbound comments and/or inquiries are able to provide information regarding five categories: 1) residents who do not have broadband but want it; 2) residents who have broadband but want a different provider; 3) residents who do not have broadband, but the broadband inventory maps indicate that they do; 4) residents who have broadband but want a faster connection speed; and 5) residents who have broadband but want a less expensive service option.

BBIs are submitted frequently by consumers via the Connected Texas website. Inquiries often seek help to identify local broadband provider options, or to learn when a specific provider may be able to provide service to that consumer. Consumer comments also provide information which may help modify maps with actual service area information. The primary objectives of CN regarding these inquiries are 1) to improve the accuracy of the state maps with submitted consumer information and follow-up field research; 2) to provide broadband options to consumers through cooperation with mapped providers and by facilitating new broadband service options; and 3) to map and analyze information from consumers about areas of unmet broadband demand and alternatives to currently mapped services. A prime example of the second option is the utilization of the Rural Utility Service satellite eligibility tool. By simply entering the consumer's address, the CN engineer can quickly determine if the consumer meets the initial qualification status for BIP satellite subsidies.

New BBIs are assigned to either the GIS department or the Engineering & Technical Services (ETS) team depending on the category entered by the consumer on the website submission form. The GIS or ETS team members respond to each inquiry according to the information entered by the consumer. Many BBIs can be resolved through desktop research; however, if a BBI requires research in the field, the assigned ETS team member conducts such research when performing field validations in the area of the inquiry, or at another such time as is practical and appropriate. GIS and ETS team members respond to and conclude BBIs via telephone contact and/or e-mail communication.

The broadband inquiry process has been implemented in each of the CN state programs with successful results. Altogether CN has received over 18,839 broadband inquiries since 2007, allowing the state programs to evaluate each inquiry for broadband demand and data verification. These inquiries are continuously examined against current broadband availability, updated every six months, to determine if previously unserved households have been expanded to and can now receive broadband at their residence. This database of broadband inquiries has also allowed the CN state programs to aggregate demand in concentrated areas to show providers the exact locations where the population has made it clear that they would purchase broadband if it was made available to them. Providers in the states have responded to this process and have expanded to areas knowing that their investment will be worthwhile. Data verification methods have also proven successful, as the state programs have been able to show those inquiries that indicate the broadband service areas are misrepresented on the map to providers, who then verify where service cannot reach in regard to that residence(s). The broadband coverage in these states has been altered to create a more accurate map based on the inquiries submitted by the public.

During this reporting period, the Connected Texas project has received a total of 12 inquiries (546 grant inception to date). As more inquiries are submitted to Connected Texas, a more thorough validation of the broadband landscape can be performed, while also allowing providers to see which areas have a high demand for broadband adoption.

MY CONNECTVIEW METHODOLOGY

My ConnectView is an interactive online mapping tool for viewing, analyzing, and validating broadband data. Developed using Esri's ArcGIS for Server and Adobe's Flex Framework and hosted and maintained by Connected Nation, My ConnectView is a multi-functional, user-friendly way for local leaders, policymakers, consumers, and technology providers to devise a plan for the expansion and adoption of broadband.

First and foremost, My ConnectView allows consumers to locate their residence and identify providers that offer broadband Internet service to that location. The interactive platform allows for users to build and evaluate broadband expansion scenarios using a wealth of data, including several coverage analysis layers, speed analyses, Community Anchor Institutions, and tools to search and export household demographic information, as well as extract data in GIS, spreadsheet, and/or PDF formats.

My ConnectView also features more interactive data layers and additional tools than ever before to allow the consumer to explore the broadband data. My ConnectView provides consumers with the ability to print, e-mail, and provide feedback on the broadband data displayed on the interactive map. Through the collection of this feedback, a visual demand for broadband is presented. This visualization allows the CN state programs the ability to validate the broadband availability for accuracy. If residents within a region state they are without broadband, but the interactive map shows otherwise, this allows CN to approach the providers within that area in an effort to trim down their coverage to more accurately represent real-world availability on the ground.

The Connected Texas project launched My ConnectView on April 2, 2012, and has received 1,767 visits this reporting period; to date the interactive mapping application has received 19,397 visits.

Speed Test Methodology

The 434 speed tests that are represented in the Connected Texas Speed Test Report during this reporting period (7,749 grant inception to date) are the result of a partnership between CN and Ookla Net Metrics. Utilizing this relationship increases the level of confidence in the data being collected and provides for a far greater sample size than could be collected by a single testing site.

Ookla owns and operates Speedtest.net, as well as develops and deploys speed tests, such as the Connected Texas speed test website, for partners around the world. This network of sites that is developed and run on its testing technology provides Ookla with a vast dataset that, due to the variability of geographic information collected across the varying speed test sites, is geocoded utilizing Geo-IP technology. This technology allows for tests to be geocoded to points of aggregation, typically larger nodes across provider networks. While there are hundreds of thousands of tests that have been conducted, the level of aggregation is only sufficient for county-level detail due to the test results being located at these larger nodes and not at an absolute location for each speed test.

In an effort to validate broadband data from the Connected Texas project, speed test information is collected throughout the state. Speed tests provide speed information on the path taken through all networks (a provider's network as well as additional networks) a local machine must connect to in order to reach the host test. The benefit of this collection of speed information is two-tiered. First, it allows for a comprehensive dataset of speeds, while also providing Connected Texas with the information on where broadband services are available. Second, unlike theoretical speed information which may be received through the data collection process, the use of speed tests provide real-world information on the speeds that currently exist within the state of Texas.

Providers Deemed Non-Viable

The following list of companies represents the remainder of the broadband provider universe that was originally identified as complete for outreach to begin for the State Broadband Initiative. These providers are not included in the Data Package for the April 2013 submission because they have been deemed non-eligible under the parameters and guidance of the SBI grant program. This list of companies includes, but is not limited to: providers offering service but below the current definition of broadband, those that have gone out of business, technology consulting firms, infrastructure or network construction companies, non-facilities based general resellers, etc.

	Company Name	URL	Comments
1	01 Communications of Texas	http://www.o1.com	CLEC in California and a nonfacilities-based nationwide reseller.
2	1Source Tech	http://www.1sourcetc.com	Does not offer broadband services; not a broadband provider.
3	21Globe, Inc.	http://www.21globe.com/	Does not offer broadband services; not a broadband provider.
4	2473365 Wireless	n/a	No information could be located on company.
5	360networks	http://www.360networks.com/	Acquired by another company.
6	36db	n/a	Acquired by ERF Wireless.
7	4D Networks Corp.	http://www.4dn.com	Provider does not serve consumers in Texas; Oklahoma provider.
8	802DSL.com	n/a	No information could be located on company; not a broadband provider.
9	A 007 Access	http://www.a007.com/	Nonfacilities-based reseller of Quest DSL and mobile wireless.
10	AAA Internet Service	http://aaainter.net/dsl	Dial-up service and is also a nonfacilities-based DSL reseller.
11	Aaccess Network Communications, Inc.	http://www.aaccess.net	Not a broadband provider.
12	ABI Network Solutions, Inc.	http://abinetworksolutions.com	General reseller; requests for information were never returned.
13	AboveNet Communications, Inc.	http://www.abovenet.com	Company is a business provider only; does not offer residential service.
14	Acceris Communications Corporation	http://www.accerispartners.com	Company does not provide Internet service; not a broadband provider.

15	Access Integrated Networks, Inc.	http://www.birch.com/About/accesscommredirect.aspx	Company no longer exists; changed name to Birch Communications in 2006.
16	Access One, Inc.	http://www.accessoneinc.com/access_one_direct.php	Company is a business provider only; does not offer residential service.
17	Access Point, Inc.	http://www.accesspointinc.com/products.htm	General reseller; nonfacilities-based.
18	Access123.net	http://access123.net/	Website is a search engine for all types of products; company is not a broadband provider.
19	Access2Go, Inc.	http://www.acc2go.com/	General reseller; nonfacilities-based.
20	Accutel of Texas, LP	http://www.accutel.net/	No viable information could be located on company; URL inactive; not a broadband provider.
21	ACERX.NET	http://acerx.net/	General reseller; nonfacilities-based.
22	ACI	n/a	Inactive; no longer in business. a subsidiary of Rhythms NetConnection; filed bankruptcy.
23	ACN Communications Services, Inc.	https://www.myacn.com/phone/dslbundle.html	General reseller; nonfacilities-based.
24	Adirondack Area Network	http://www.aanet.org/	Provider does not serve consumers in Texas; New York State provider.
25	Advance Telephone Services	http://www.advanced-telephone.com/	Company does not provide Internet service; not a broadband provider.
26	Advanced Communicating Techniques	n/a	No viable information could be located on company; URL inactive; not a broadband provider.
27	Advanced Integrated Technologies, Inc.	http://www.a-i-t.com/	Company does not provide Internet service; not a broadband provider.
28	Advanced Wireless Solutions	http://www.awsolutions.net	Company is B2B provider of networking solutions; not a broadband provider.
29	AEConnect	n/a	No information could be located on company; not a broadband provider.
30	AEI Wireless	http://www.aeiwireless.net	Acquired by Internet America.

31	Aerie Network Services, Inc.	http://www.aerienetworks.com/	No viable information could be located on company; URL is web search engine; not a broadband provider.
32	Aero Communications, LLC	n/a	Company categorized under Telecommunications consultant; no website located and is not a broadband provider.
33	Aeroconnect	http://www.aeroconnect.net	Company is B2B provider of networking solutions; not a broadband provider.
34	Affinity Network, Inc.	http://www.affinitynetworkinc.com/	Company is B2B provider of long distance and calling card services; not a broadband provider.
35	Affordable USAWide.Net, Inc.	http://www.usawide.net	General reseller; non-facilities based; offers DSL and dial-up.
36	Air2LAN	n/a	Company was purchased by U.S. Wireless Online in February 2005; no longer in business.
37	AirChips Communcation, LLC	http://www.airchips.com	Company performs network consulting services and does not have broadband operations; not a broadband provider.
38	AIRDIS Telecom	http://www.airdis.com/	Company sells telecommunications equipment to business and does not have broadband operations; not a broadband provider.
39	Airewaves Broadband, LLC	www.airewaves.com	Airewaves is an Internet media download center; not a broadband provider.
40	Airimba Wireless, Inc.	http://airimba.com/	Provider supplies bulk level agreements to housing communities; B2B
41	Airmail247.com	http://airmail247.com/	No viable information could be located on company; URL is not located; not a broadband provider.
42	Airo Networks, LLC	http://www.aironetworks.com	No viable information could be located on company; URL is not located; not a broadband provider.
43	Airocom	http://www.airocom.net	Acquired by NetWest Online.
44	Akeva	n/a	Reseller of Verizon Mobile Phones in mall kiosk; not a broadband provider.

45	Alec, Inc.	http://www.singlepipecom.com	Nonfacilities reseller of DSL services; however does not serve the state of Texas.
46	Allo Telecommunications, Inc.	http://tc.allophone.com/	Nonfacilities reseller of business circuits.
47	Allumera	http://www.amirarif.com/	Not a broadband provider.
48	Almega Cable	http://almega.com	Currently only supplies Internet connectivity to one anchor institution in Texas; no residential services.
49	AltiComm, Inc.	n/a	Based on Internet research and PUCT report the organization is nonfacilities-based or resells internet services.
50	Amarillo Cell Telco	http://www.cell1amarillo.com/	Acquired by Alltel.
51	American Dial Tone (Ganoco, Inc.)	n/a	Company offers dial-up services only.
52	American Fiber Network, Inc.	https://www.afnltd.com	Company performs network consulting services and does not have broadband operations; not a broadband provider.
53	Americans Conex, LLC	n/a	No viable information could be located on company; URL is not located; not a broadband provider.
54	America's Tele-Network Corp	n/a	Company is no longer in business.
55	Americatel Corporation	http://www.teligent.com/	Not a broadband provider; research yielded company is a reseller of pre-paid and long disatnce services.
56	AmeriMex Communications Corp.	http://www.amerimex.biz/	Company sells international calling plans and does not provide broadband services; not a broadband provider.
57	AMERIPHONE NETWORK, LLC	n/a	No viable information could be located on company; URL is not located; not a broadband provider.
58	Amigos - Tu Compania De Telefono	n/a	No viable information could be located on company; URL is not located; not a broadband provider.
59	Amtel	n/a	No viable information could be located on company; URL is not located; not a broadband provider.

60	An Elite State Telephone Company	n/a	No viable information could be located on company; URL is not located; not a broadband provider.
61	Annox, Inc.	n/a	Company is no longer in business and is listed as inactive in the state of Texas.
62	Antioch Wireless Broadband	n/a	No viable information could be located on company; URL is not located; not a broadband provider.
63	AP Telecommunications	http://www.academicplanet.com	Company offers dial-up services only; not a broadband provider.
64	Apache Networks	http://www.apachenetworks.net	Company offers VOIP services only; not a broadband provider.
65	Apogee Telecom, Inc.	http://www.apogeenet.net	Company does not provide direct residential service; design and build networks for institutions of higher learning; not a broadband provider.
66	Arrowheadnet.com	http://www.arrowheadnet.com/	Company offers web hosting services only; not a broadband provider.
67	Artisan Communications	http://www.artisan.tv	Company offers telephony services to business only; not a broadband provider.
68	ATC Outdoor DAS, LLC	n/a	Company offers radio services for business only; not a broadband provider.
69	A-Tech Telecom, Inc.	n/a	No viable information could be located on company; URL is not located; not a broadband provider.
70	Ateck Internet Providers	www.atxip.net/	Information located on company shows no longer in business.
71	AURIC Marketing LLC	n/a	Company offers Pots and Private T-1 services; not a broadband provider.
72	Austin Bestline Company	http://www.bestline.net/	Reseller who provides Internet access to business only; B2B provider.
73	Austin Teleco Usa, Inc.	n/a	No viable information could be located on company; URL is not located; not a broadband provider.
74	AzleTexas.Net	n/a	Information located on company shows not a broadband provider.

75	Backbone Communications, Inc.	http://www.backbonecommunications.com/	Not a broadband provider; assist with development of technology platforms for classroom environment.
76	bargainisp.net	http://www.bargainisp.net/	Not a broadband provider; web search engine.
77	Basicphone, Inc.	n/a	Information located on company shows no longer in business.
78	BCN TELECOM, Inc.	http://www.bcntele.com/	General reseller; nonfacilities-based; business accounts only.
79	Bear Creek Copperfield ISP	n/a	Information located on company shows no longer in business.
80	Bear Technologies Corporation	http://www.beartech.com	Company offers services to business subscribers only.
81	Bellerud Communications, LLC	http://www.bellerudcommunications.com/	Company is not a Broadband provider; offers Telephone services to only.
82	Bellsouth BSE, Inc.	n/a	Assets were subsumed by Clearwire Corporation; inactive URL.
83	BelWave Communications	http://www.belwave.com	Company offers services to business subscribers only.
84	Best Line Communications	http://www.bestline.net/	Company offers services to business subscribers only.
85	BetterWorld Telecom, LLC	http://betterworldtelecom.com	Company offers services to business subscribers only.
86	Beyond Communications	n/a	Not a broadband provider; URL is not located; secured hotspot provider for private communities.
87	BioVLAN	http://www.biovlan.com	Company offers turnkey solutions and is not a broadband provider.
88	Birch Communications	http://www.birch.com/About/birchlinkfamily.aspx	Company is a reseller of business services only.
89	Biztel, L.P.	n/a	No viable information could be located on company; URL is not located; not a broadband provider.
90	Blonder Tongue Telephone, LLC	http://www.blondertongue.com/	Company offers equipment solutions and is not a broadband provider.

91	Blue Corner Communications, LLC	n/a	No viable information could be located on company; URL is not located; not a broadband provider.
92	Blue Moon Solutions, Inc.	http://www.bmsol.com	No viable information could be located on company; URL is not located; not a broadband provider.
93	Blue Sky Telecommunications, LLC	http://www.blueskycommunications.net/contact-us	Company is not a Broadband provider; offers telephone services only.
94	Blue Wireless & Data, Inc.	http://www.bluewirelessdata.com/	No viable information could be located on company; URL is not located; not a broadband provider.
95	Bluebonnet Internet	http://www.bluebonnet.net	Company is not a Broadband provider; offers telephone services only.
96	Bold Communications networks, LLC	http://www.boldwireless.net/	No viable information could be located on company; URL is not located; not a broadband provider.
97	Border Wireless	n/a	No viable information could be located on company; URL is not located; not a broadband provider.
98	Bravo Net	http://www.bravo.net	No viable information could be located on company; URL is not located; not a broadband provider.
99	Brazoria Dot Net	n/a	No viable information could be located on company; URL is not located; not a broadband provider.
100	Broadband National	http://www.broadbandnational.com	General reseller; nonfacilities-based.
101	Broadlink Telecom, LLC	http://www.broadlinktelecom.com/	Company is a reseller of business services only.
102	Broadvox-CLEC, LLC	n/a	Not a broadband provider; direct conversation determined entity does not have a network for broadband services.
103	Broadweave Networks Of Texas, LLC	n/a	According to Texas PUCT CLEC report; phone services only.
104	Budget Prepay, Inc.	http://www.budgetphone.com	According to Texas PUCT CLEC report they offer phone services only.
105	Business Telecom, Inc.	n/a	Now owned by Deltacom Inc. according to Texas PUCT CLEC report.

106	BYOTV Media Corporation	n/a	Not a broadband provider; specializes in broadcast video services.
107	Cable And Wireless Americas Operations, Inc.	www.cw.com	Not a broadband provider; Internet hosting service company.
108	CAC MediaNet, Inc.	n/a	Not a broadband provider.
109	Call One	http://www.callone.com	Not a broadband provider; business solutions services.
110	CallFree	n/a	Not a broadband provider; POTS and long-distance services only.
111	Camalott Communications	http://www.camalott.com	Acquired by Texas Communications.
112	Camino-Net Internet Services	http://www.camino-net.com	Not a broadband provider; offers dial-up only.
113	Candice Clark Consulting	http://www.candiceclarke.com/	Not a broadband provider; consulting firm.
114	Capital Telecommunications, Inc.	http://www.captel.com/	Not a broadband provider; hardware provider for the deaf's telecommunication devices.
115	Casey & Gentz	http://www.phonelaw.com/	Not a broadband provider.
116	CAT Communications International, Inc.	http://www.ccitelcom.com/	Not a state provider per representative of the company.
117	Cavalier Telephone LLC	http://www.cavtel.com/	Company merged with PAETEC.
118	CCG Consulting, LLC	http://www.c-c-g.com/	Not a broadband provider; telecommunications consulting services.
119	CCIS.net	http://www.ccis.net	Inactive; no longer in business.
120	Cdi Broadband	http://www.cdibroadband.com	Acquired by TierOne Converged Networks.
121	Celito Communications, Inc.	http://www.celito.net/	This company does not offer service in Texas.

122	Cellular One of Amarillo	n/a	Acquired by Alltel.
123	Centel Communications	n/a	No URL; no FRN; non-responsive to outreach activity.
124	CenTex Web Access	n/a	This company is not a broadband provider.
125	Central Telecommunications	n/a	This company is not a broadband provider.
126	Central Texas Technology Solutions	http://www.cttsonline.com	Not a broadband provider; company offers IT management and business consulting and solutions.
127	Centramedia Inc.	http://www.centramedia.com	Acquired by ERF Wireless.
128	Century Alpha	n/a	This company is not a broadband provider.
129	Chaparral Broadband	n/a	Not a broadband provider in Texas.
130	Chip Shot.Net	http://www.chipshot.net	Not a broadband provider; website indicates dial-up service offerings only.
131	Christoval Communications	n/a	Not a broadband provider per a representative of the company.
132	CIR Wireless Net	n/a	Unable to locate any current information on this company; no active website.
133	City of Brownsville	n/a	Grant Awardee; not a broadband provider.
134	City of El Paso	n/a	Grant Awardee; not a broadband provider.
135	CityNet Texas, LLC	n/a	This company is not a broadband provider.
136	Cleartel Communications, Inc	n/a	Acquired by Birch Communications.
137	Cleartouch.Com	n/a	Unable to locate any current information on this company; no active website.

138	Cleburne.com	n/a	Unable to locate any current information on this company; no active website.
139	Cletel Telephone Service, LLC	n/a	This company is no longer in business.
140	CloseCall America, Inc.	http://www.closecall.com/	General reseller; nonfacilities-based.
141	Cobalt Broadband	http://www.cobaltbroadband.com	Acquired by JAB Wireless.
142	Cobridge Communications	http://www.cobridge.net	Acquired by Fidelity Communications.
143	Cognisurf	http://www.aboutus.org/CogNiSurf.com	Not a broadband provider.
144	CommCentral, Inc.	n/a	General reseller; nonfacilities-based; inactive URL.
145	Communication Lines, Inc.	n/a	Not a broadband provider; Texas PUCT CLEC report identifies POTS service only.
146	Communications Pearl, LLC	n/a	Reseller; nonfacilities-based.
147	Computer Network Technology Corporation	http://www.brocade.com	Not a broadband provider; sells communication equipment to operators.
148	ComTech 21, LLC	http://www.comtech21.com	Representative stated their organization does not provide service in Texas.
149	Comtel Services	http://www.comtelservices.com/	Not a broadband provider; provides wiring solutions.
150	Connect Insured Telephone Company	n/a	Inactive; no longer in business; Internet research rendered no valid information.
151	ConnectSouth	n/a	Not a broadband provider; managed services only.
152	Constant Communications, Inc.	www.constant.com	Inactive; no longer in business; invalid contact information.
153	Contel of Texas, Inc.	n/a	Acquired by GTE in 1992.

154	Convergent Communications Services, Inc.	http://converg.com/	This company is not a broadband provider.
155	Corban Networks	http://www.corbannetworks.com	Inactive; no longer in business; invalid contact information.
156	Cordia Communications Corporation	https://www.cordia.us/	Not a broadband provider; Texas PUCT CLEC report identifies POTS and long-distance services only.
157	Cost Plus	n/a	Not a broadband provider; Texas PUCT CLEC report identifies POTS and long-distance services only.
158	Covad Communications	http://www.covad.com	Acquired by MegaPath.
159	Cox Communications	n/a	Acquired by SuddenLink (Texas).
160	CP Telco, LLC	n/a	Not a broadband provider; no evidence of operations.
161	Crescent Broadband	n/a	Inactive; no longer in business; no active or valid information identified.
162	CrossConnect	n/a	Inactive; non-state provider.
163	Crosswind	http:/www.crosswind.net	Acquired by ERF Wireless.
164	CS Wireless Systems, Inc.	n/a	Acquired by Clearwire Corporation.
165	Cuda Communications	n/a	Inactive; non-state provider.
166	Current Communications of Texas, LP	n/a	Not a broadband provider.
167	Curtis Blakely	n/a	Not a broadband provider; certified public accountant.
168	CVC CLEC, LLC	n/a	Inactive-Non state provider per representative of the company.
169	Cyberbay	http://www.cyberbay.com	General reseller; nonfacilities-based.

170	CyberStation, Inc.	http://www.cst.net	Not a broadband provider.
171	Cybertel, LLC	www.westernbroadband.com	Inactive; no longer in business.
172	Cypress Communications Operating Company, LLC	n/a	Not a broadband provider; local and long distance services only.
173	DashLink	n/a	Inactive; no longer in business.
174	DATACentric Broadband	n/a	Inactive; no longer in business.
175	Del Rio LIVE!	n/a	Inactive; no longer in business.
176	DelRio.com	n/a	Inactive; no longer in business.
177	DeltaCom, Inc.	http://www.deltacom.com	Inactive; non-state provider.
178	Deltaforce	http://www.deltaforce.net	Not a broadband provider; dial-up services only.
179	deluxehost.com	http://deluxe-host.com	Not a broadband provider; web design and hosting.
180	DFW Broadband	http://www.dfwbroadband.net	Not a broadband provider; business to business service provider.
181	DGUI	http://www.dgui.com/	Inactive; no longer in business.
182	Dial National	http://www.dialnational.com/	Inactive; no longer in business.
183	Dialer.net	http://www.dialer.net/internet_access/United_States.html	Not a broadband provider; international dial-up services
184	Diamond Telco-Your Home Telephone Store	n/a	Not a broadband provider; POTS services only.
185	Digital Communities	n/a	Not a broadband provider; coalition organization for WIMAX development.

186	Digitalpath Texas	http://www.1txbb.net	Acquired by First Texas Broadband.
187	Direct Telephone Company, Inc.	n/a	Not a broadband provider; POTS services only.
188	DO Communications	n/a	Inactive; no longer in business.
189	Dot 10 Wireless, LLC	http://www.dot10wireless.com	Inactive; no longer in business.
190	Dot11 Networks	n/a	Acquired by JAB Wireless.
191	DR Telecom, Inc.	n/a	This company is not a broadband provider.
192	East Texas Rural Net	n/a	Inactive; no longer in business.
193	East Texas WISP	http://www.etwisp.net	Inactive; no longer in business.
194	Easton Telecom Services, LLC	n/a	Not a broadband provider; POTS and long-distance services only.
195	Easy Cellular, Inc.	n/a	This company is not a broadband provider.
196	Eccentrix Technologies, LLC	http://www.eccwireless.com/	Acquired by another company.
197	EdnaOnline	n/a	This company is not a broadband provider.
198	e-GWS	n/a	This company is not a broadband provider.
199	ELC Internet Services, Inc.	http://www.elc.net	Acquired by The SPECnet, Inc.
200	Element Networks, LLC	http://txairmail.net/residential.html	Acquired by Enet Internet Solutions.
201	Entelegent Solutions, Inc.	n/a	Not a broadband provider; business telephone services only.
202	Entex Telephone Cooperative	n/a	Inactive; no longer in business.

203	Ernest Communications, Inc.	http://www.ernetstelecom.com	Not a state provider per a representative of the company.
204	Esodus Communications, Inc.	n/a	Inactive URL and no direct contact information available; no longer in business.
205	Essential.com, Inc.	n/a	Texas PUCT CLEC reseller; no services identified; not a broadband provider.
206	Everybody's Phone Company	http://www.everybodysphonecompany.com/	Provides pre-paid phone services; not a broadband provider.
207	EveryCall Communications	http://www.everycall.com/	Local and long-distance phone plans to residential and business; not a broadband provider.
208	Excel Telecommunications, Inc.	www.excel.com	Local and long distance phone plans to residential and business; not a broadband provider.
209	Exigo Office	www.exigo.com	Not a broadband service provider; consulting firm.
210	Express Telephone Services, Inc.	n/a	Not a broadband service provider; POTS and long-distance resell only.
211	EZ Connect, Ltd.	n/a	Texas PUCT CLEC reseller; local and long distance; not a broadband provider.
212	EZ Phone, Inc.	n/a	No longer in business; telephone number disconnected; e-mail exchange error received.
213	EZ Talk Telecommunications	n/a	Texas PUCT CLEC report indicates bankruptcy; all contact information invalid; no longer in business.
214	Facilities Communications International	n/a	No longer in business; telephone number disconnected; e-mail exchange error received.
215	Familytel of Texas, LLC	n/a	Not a broadband provider; a company representative indicated the organization is a reseller of telephone services only.
216	Fast Dependable Access	http://www.fda.net/	No longer in business; invalid URL.
217	Fastline ISP	http://www.fastlineisp.com	No longer in business; telephone number disconnected; inactive URL.

218	Fiesta Telephone Company, Ltd.	n/a	Texas PUCT CLEC reseller; local and long distance; not a broadband provider.
219	First World Communications	n/a	No longer in business; all contact information is inactive.
220	Flow Communications	n/a	Not a broadband provider; no Texas PUC filing.
221	Fort Bend Telephone Company	n/a	Not a broadband provider; no Texas PUC filing.
222	France Telecom Corporate Solutions, Inc.	n/a	Not a broadband provider; received a response from a company representative indicating the organization does not provide broadband services.
223	Freedom Communications USA, LLC	n/a	Received an initial response to outreach activity.
224	Frontera Telecommunications, Inc.	www.fronteratelecom.com	Not a broadband provider per a representative of the company.
225	Frontier Broadband	http://www.frontierbroadband.com	Acquired by ERF Wireless.
226	Gerdes Web Services	n/a	Inactive; no longer in business; contact information invalid.
227	Gilmer Cable Television Company, Inc.	http://www.tatertv.com	Inactive; no longer in business. Notification received form provider December 2012.
228	Global Connection Inc. of America	http://connectwithglobal.com	Not a broadband provider; provides local, long-distance, and dial-up Internet only.
229	Global Metro Networks Texas, LLC	n/a	No longer in business per Texas PUCT CLEC report-relinquished operations.
230	Globaltech 2000, Inc.	n/a	No longer in business; all contact information is inactive.
231	GO-COMM, Inc.	n/a	Acquired by Airband Communications.
232	Gordon Communications, Inc.	http://www.gordonone.com	Representative of the company indicated last mile connectivity is made available.

233	Grande River Technology Group	n/a	Not a broadband provider; Internet research identifies company as communication lines and tower construction company.
234	Granite Telecommunications, LLC	n/a	Not a broadband provider; representative indicated company is a regulatory consulting firm.
235	Great America Networks, Inc.	http://www.ganconference.com/	General reseller; nonfacilities-based.
236	Great West Services, LTD	n/a	No longer in business per Texas PUCT CLEC report-relinquished operations.
237	Group Long Distance, Inc.	n/a	Not a broadband provider; long-distance service provider only.
238	GST Telecomm Texas, Inc.	n/a	Acquired by Time Warner.
239	H.S.I. Communications, LLC	n/a	No longer in business; contact information invalid.
240	Habla Comunicaciones, Inc.	n/a	Internet research identified company filed Chapter 7 bankruptcy; no longer in business.
241	Hamilton Telecommunications	http://www.hamilton.net	Spoke to a representative of the company; no resell activity in Texas.
242	HBF Group, Inc.	n/a	Not a broadband provider; acquired by West Corporation; a VoIP service provider.
243	Hello Depot	http://www.hellodepot.com	General reseller; nonfacilities-based.
244	Home Wireless Company	n/a	No longer in business; no relative data found during Internet research.
245	Homefone Services, LLC	n/a	Not a broadband provider; phone services provider only.
246	Horizon Broadband	http://horizonbroadband.net	Non-state broadband provider.
247	Horizon WiFi Texas	http://horizonwifi.com	Not a broadband provider; confirmed with a representative of the company.
248	Hubwest	http://www.hubwest.com	Not a broadband provider; dial-up and web hosting services only.

249	Hubwest Protected Networks LLC	http://www.hubwest.com	Not a broadband provider; dial-up and web hosting services only.
250	HyperHog.Net	http://www.bci1.com	Speeds below FCC definition of broadband.
251	Hyperoam	n/a	No longer in business; inactive URL or viable data supporting operational status as active.
252	i9 Networks	n/a	No longer in business; inactive URL or viable data supporting operational status as active.
253	ICG ChoiceCom, LP	n/a	Reviewed Texas PUCT CLEC; recent transfer of ownership-June 2011; new contact identified.
254	I-Element, Inc.	n/a	Not a broadband provider; statement received from a representative of the company.
255	I-Link Communications, Inc.	n/a	Not a broadband provider; provider of webinar support and equipment.
256	Imbris, Inc.	http://www.imbris.com	Inactive; non-state provider.
257	IMGISP.NET	http://www.imgisp.net/	Not a broadband provider; search engine and buyers guide to ISP.
258	In Touch Communications	n/a	No longer in business; per Texas PUCT CLEC report.
259	Incredible Networks	http://www.incredible.gr	Not a broadband provider; provides WEB hosting services.
260	Inercom Communications Inc.	www.inercom.com	Inactive; no longer in business; contact information invalid; URL for sale.
261	Inetworks Group, Inc.	http://www.inetworksgroup.com	Received a refusal to participate from a representative of the company during the October 2011 outreach session; website identifies business type solutions; cannot interpret if the company is facilities-based.
262	Infotelecom, LLC	http://infotelecom.us	Not a broadband provider per statement received from a representative of the company.
263	Innercity Fibernet, LLC	http://www.innercityfiber.net	Not a broadband provider per statement received from a

			representative of the company.
264	Integra Telecom	http://www.integratelecom.com	Not a broadband provider per a statement from a company representative; non-facilities based long-distance service provider.
265	Integrated Communications Consultants, Inc.	http://www.cromaine.com	Based on website research, company is a telecommunications consulting firm.
266	Integrated Digital Solutions	http://www.integratedds.com	Not a broadband provider; website development service provider.
267	Integrity Online Brazos Valley	http://www.iolbv.com	Not a broadband provider; dial-up service offering only stated on website.
268	Interactiveinfo.com Inc.	http://www.rocketbroadband.com	Inactive; non-state provider.
269	Interlink Wireless	n/a	Acquired by Internet America Wireless.
270	Internap Network Services Corporation	http://www.internap.com	Not a broadband provider; business to business solutions provider.
271	Internet Texas	http://www.itexas.net	Acquired by ERF Wireless.
272	Internet Texoma, Inc.	http://www.texoma.net	Not a broadband provider; website advertises speeds below FCC standard.
273	Ionex Telecommunications, Inc.	n/a	Acquired by Birch Communications.
274	IPNS	http://www.ipns.com	Inactive; non-state provider.
275	iRadical	n/a	Not a broadband provider; Internet research rendered no organization information.
276	ISPartner.net	n/a	Not a broadband provider; Internet research rendered no organization information.
277	Jenco Speed Web	http://www.jencospeed.net	Inactive; non-state provider.
278	John Staurulakis Incorporated	http://www.jsitel.com	Not a broadband provider; consultant services only.

279	Jones Broadcasting	http://www.jonesbroadcasting.com	Not a broadband provider; consulting services only.
280	Kentucky Data Link, Inc.	http://www.kdlinc.com	Acquired by Windstream; Connected Nation national team outreach.
281	Kentucky Universal Telecom, Inc.	n/a	Not a broadband provider; Texas PUCT CLEC report identifies residential POTS only.
282	KeyOn Communications, Inc.	http://www.keyon.com	Acquired by JAB Wireless.
283	Koyote Internet	n/a	Acquired by eNet.
284	L&D Wireless	n/a	Inactive; no longer in business; per previous owner business operations was terminated.
285	Lake Country Internet	n/a	Inactive; no longer in business.
286	Lake Kiowa	n/a	Not a broadband provider; Internet research rendered no organization information.
287	LARIAT.NET	http://www.lariat.net/	Inactive; non-state provider.
288	LavonWeb.net	n/a	Acquired by TierOne Converged Networks.
289	LayerOne, Inc.	n/a	Not a broadband provider; acquired by Switch and Data-infrastructure and access management services.
290	LCSisp.com	http://www.lcsisp.com/index.cfm	Not a broadband provider; dial-up service only.
291	LEC Unwired, LLC	n/a	No longer in business; Internet research identified operations transitions to other companies.
292	Legacy Long Distance International, Inc.	http://www.golegacy.com	Long distance, pay telephone, pager, and customer services only provider; not a broadband provider.
293	Lightning Connect	http://www.lightningconnect.net	No longer in business; invalid contact information and extensive Internet research declares no operations.
294	LightSpeed Wireless	n/a	Acquired by Blue Wireless and Data.

295	Linden Wireless	n/a	Inactive; no longer in business; inactive URL or valid contact information.
296	LinkAmerica.Net	http://www.linkamerica.net/	No longer in business; telecommunications refurbishing was primary business.
297	Local Telecom Systems, Inc.	n/a	Not a broadband provider; local calling card services only.
298	Lone Star Communications	http://lonestarcom.com	General reseller; nonfacilities-based.
299	M.L.M. Telecommunications, Inc.	n/a	Inactive; no longer in business.
300	MainBoard	http://www.mainboard.cc/internet.htm	General reseller; nonfacilities-based.
301	Maine Cable and Wireless	http://www.mainecableandwireless.com	Not a broadband provider; system integrator and solutions provider.
302	Managed Services, Inc.	n/a	Not a broadband provider based on limited information available on the Internet.
303	Marcin Company	n/a	Not a broadband provider.
304	Master Call Communications, Inc.	http://www.choosemcc.com	General reseller; nonfacilities-based; resells long distance and phone cards; not a broadband provider.
305	McGraw Communications	http://www.mcgrawcom.net	General reseller; nonfacilities-based; received a reply from a company representative indicating non-facility based reseller.
306	Mesh.Net	http://www.mesh.net	Acquired by VRFuturenet.
307	METTEL (Metropolitan Telecommunications)	http://www.mettel.net	General reseller; nonfacilities-based; received a reply from a company representative indicating nonfacilities-based reseller.
308	MidTech	n/a	Not a broadband provider; no relevant information obtained from Internet research to classify as an ISP.
309	Millennium One Communications, Inc.	n/a	No longer in business; telephone disconnect message and e-mail returns via Microsoft Exchange.

310	Miracletel Telephone Service, LLC	www.miracletel.com	Inactive; no longer in business; invalid contact information.
311	Mobilelitie, LLC	http://www.mobilitie.com	Not a broadband provider; manages and leases tower infrastructures.
312	Momentum Internet & Computer Services	http://www.moment.net	Acquired by ERF Wireless.
313	Momentum Online	n/a	Acquired by ERF Wireless.
314	Momentum Telecom, Inc.	https://www.momentumtelecom.com/	General reseller; nonfacilities-based; wholesaler and dial-up service provider.
315	Moviestar Telecom, Inc.	n/a	CLEC Report indicates long distance and local telephone service; no URL listing.
316	Mundo Telecom	http://www.mundotelecom.biz	Inactive; no longer in business; Texas PUCT CLEC report identifies organization as being relinquished.
317	MXD	n/a	No services defined within CLEC report; telephone number disconnected; no response to e-mails.
318	N. Texas Wireless	n/a	Inactive; no longer in business; invalid contact information.
319	Nanomega.Com	www.nanomega.com	Inactive; no longer in business; invalid contact information.
320	National Clear Tone, LP	n/a	Inactive; no longer in business; invalid contact information.
321	National Discount Telecom, LLC	n/a	Inactive; no longer in business; invalid contact information.
322	Navigator Telecommunications, LLC	http://www.navtel.com	Representative of the company stated the organization does not provide broadband residential services; not a broadband provider.
323	Nei Datacom	http://neidatacom.com	Not a broadband provider; designs and constructs telecommunication infrastructure.
324	Net Star Telecommunications	http://www.netstarwireless.com	Not a broadband provider; per a representative of the company only provides business to business solutions.

325	Net Talk.Com, Inc.	http://www.nettalk.com	General reseller; nonfacilities-based; VoIP and WiFi services offered.
326	NetAccess, Inc.	http://www.nas.net/	Not a broadband provider; business portal provider.
327	NetSpeed Online	www.netspeed-online.net	Inactive; no longer in business; URL inactive; no valid contact information identified.
328	Netstreamlive	http://www.netsreamlive.com	Not a broadband provider; provides webcasting events via satellite for special events.
329	NetVoice	n/a	Not a broadband provider; a representative stated service offering is VoIP.
330	Neutral Tandem-Texas, LLC	http://www.neutraltandem.com/	Not a broadband provider.
331	New Access Communications LLC	n/a	Not a broadband provider; provides POTS only.
332	New Edge Networks, Inc.	http://www.newedgenetworks.com/	Acquired by another provider.
333	New Horizons Communications Corporation	http://www.nhcgrp.com/	Not a broadband provider; business services only.
334	NewGenWireless	http://www.newgenwireless.com	Not a broadband provider; provides cellular phone packages.
335	Newphone	http://www.newphone.com	Not a broadband provider; phone services only per Texas PUCT CLEC report.
336	Nextg Networks of Illinois, Inc.	http://www.nextgnetworks.net	Not a broadband provider; provider serves as an integrator; nonfacilities-based operations.
337	Nexus Communications, Inc.	http://www.tsihomephone.com/	Not a broadband provider; telephone services provider only.
338	NoDial.net	n/a	No active website; no longer in business.
339	NoDial.net	n/a	Acquired by Internet America Wireless.
340	North Dallas Wireless	n/a	Not a broadband provider; cellular telephone services only.

341	North East Texas Wireless Initiative	n/a	Not a broadband provider; Internet research leads to a BLOG website.
342	North Texas UnWired	n/a	Inactive; no longer in business; Internet research concludes no business operations and inactive URL.
343	North Texas Web Services	http://www.ntws.net	Acquired by eNet.
344	Northeast Texas Broadband, LLC	n/a	Acquired by eNet.
345	Northeast Texas Online	http://www.neato.net	Acquired by eNet.
346	Northwest ISP	http://www.northwestisp.com	Inactive; no longer in business.
347	NSN Wireless, L.P.	http://www.nsn-wireless.net	Not a broadband provider; business to business solutions provider.
348	Ntegrity Telecontent Services, Inc.	n/a	Not a broadband provider; content provider for MDU via other providers transport.
349	Ntera, Inc.	n/a	Inactive; no longer in business; invalid contact information and inactive URL.
350	Nucentrix Broadband Networks	n/a	Acquired by Clearwire Corporation.
351	Oklahoma ECG, L.L.C.	n/a	Not a broadband provider; POTS and long distance services only.
352	Omni Internet	www.omniglobal.net	Acquired by West Central Net.
353	One Connect	www.oneconnect.ca	Not a broadband provider; business to business solutions provider.
354	One Ring Network	http://www.cvc.net/	Not a broadband provider; business to business solutions provider.
355	One Star Long Distance, Inc.	http://www.onestarld.com/	Not a broadband provider; local and long-distance services only.
356	One-Call Telcom, Inc.	http://www.onecalltelecom.com/	General reseller; nonfacilities-based.

357	Open Range Internet	www.openrangecomm.com	Inactive; non-state provider.
358	Overarch Broadband	http://www.overarch.com	Inactive; non-state provider.
359	Pacific Internet Exchange	http://www.pie.us/	General reseller; nonfacilities-based.
360	Pac-West Telecomm Inc.	http://www.pacwest.com/	Not a broadband provider; wholesale telephone services.
361	PAETEC Communications, Inc.	http://www.paetec.com/	Acquired by another company.
362	Paknet Limited	n/a	Inactive; non-state provider..
363	Pampa Cyber Net	http://www.pan-tex.net/	Not a broadband provider; database management services.
364	Panaband	www.panaband.com	Inactive; no longer in business; invalid contact information and inactive URL.
365	Panoptos, LLC	n/a	Inactive; no longer in business; telephone number indicates disconnected service and no URL listing.
366	Partnership Broadband	http://www.partnershipwireless.com	Acquired by JAB Wireless.
367	Peerless Network of Texas, LLC	http:/www.peerlessnetwork.com	Non-state broadband provider.
368	Pelican Bay Internet	n/a	No information.
369	PELZER COMMUNICATIONS CORPORATION	www.pelzercom.com	Inactive; no longer in business; assets are being sold per company representative.
370	Permian Basin Online	http://www.netwest.com	Acquired by NetWest Online.
371	PhoneCo, L.P.	http://www.phoneco1.com	Not a broadband provider.
372	Phone-Link, Inc.	n/a	No longer in business; disconnected telephone service and inactive URL

			located.
373	Pics.Net	http://www.pics.net	Subsidiary of WesTex Connect (corporate staff).
374	Piney Woods Wireless	www.pineywoodswireless.com/	Inactive; no longer in business; a representative stated operations were terminated about 5 years ago.
375	Planet Online	http://www.planetonline.net/	Not a broadband provider; web-hosting services.
376	Posner Telecommunications Inc.	n/a	Not a broadband provider; a paging service company.
377	PRAIRIENET	http://www.prairienet.us/	Acquired by JAB Wireless.
378	PremoWeb	http://www.premoweb.com/about_us/contact_us.html	Not a broadband provider; national dial-up service.
379	Presidio Community Wireless Network	http://www.pcwn.net	Not a broadband provider; serving as a a community hotspot network.
380	PRIDE Network, Inc.	n/a	Subsidiary of NTS Communications.
381	PrismNet	www.prismnet.com/	Not a broadband provider; statement of not providing broadband service received from a representative of the company.
382	Progressive Concepts, Inc.	http;//www.progressive-concepts.com	Not a broadband provider; equipment supplier for broadcast applications.
383	Pro-Sky	http://www.prosky.net/products/residental_wireless/index.html#	Inactive; no longer in business; invalid contact information; inactive URL.
384	Provis Broadband	n/a	General reseller; nonfacilities-based; representative of the company indicated wireless assets were sold; selling other provider services only.
385	Purelyonline	www.purelyonline.com	Inactive; no longer in business; Internet research identified status of organization.
386	PVCo.net, LLC	http://www.mypvco.com	Acquired by Jab Wireless.

387	QPQ Marketing, Inc.	n/a	Not a broadband provider; Texas PUCT CLEC report identifies residential POTS only.
388	Quality Telephone, Inc.	http://www.qtelephone.com	Not a broadband provider; received a response from a company representative indicating the organization does not provide broadband services.
389	QuanTumNet ISP	http://www.qins.net	Inactive; no longer in business; invalid contact information and inactive URL.
390	Quick-Tel Communications, Inc.	http://www.quick-tel.com/	Not a broadband provider; a provider of business telecommunications equipment.
391	Qwest Communications Company, LLC	http://www.qwest.com/	Acquired by CenturyLink; Qwest had no operations in the state.
392	Qzip.Net	http://www.qzip.net	Not a broadband provider; business solutions services.
393	R2R Connectivity	www.r2rconnect,net	Not a broadband provider; provides service below FCC standard.
394	Randy White Telecommunications, Inc.	http://www.rwttelecommunications.com	General reseller; nonfacilities-based.
395	Reach Direct, Inc.	n/a	Not a broadband provider.
396	Reconnect Plus, LLC	n/a	Inactive; no longer in business; invalid contact information and inactive URL.
397	Region 18 Education Service Center	n/a	Grant awardee.
398	Regional Wireless Networks	n/a	Not a broadband provider; Internet research found no relevant information.
399	Reliant Communications, Inc.	http://www.reliant-communications.com/	General reseller; nonfacilities-based.
400	Renaissance Networks	http://www.renaissancenetworks.com/	Small business technology consulting and investment company serving Albuquerque, New Mexico.
401	Rhino Communications	http://www.rhinocommunications.net	Acquired by JAB Wireless.

402	RHO Wireless	http://www.rhowireless.com/Default.aspx	This company offers wireless and hardware/software small business solutions in the Dallas/Fort Worth area.
403	RioWave.net	http://www.svideo.com/wi.html	Company operates as Svideo offering hardware and wireless at speeds of 128Kbs up and 512Kbs down.
404	Rosebud Telephone	n/a	General reseller; nonfacilities-based; no URL listing.
405	Rx Technology	http://www.rx-tech.com	Web host and reseller for south Texas businesses and government entities.
406	Sage Telecom, Inc.	http://www.sagetelecom.net/	Not a broadband provider; dial-up services only.
407	Sanswire.Net	http://www.sanswire.com	This is a satellite surveillance company.
408	SATEXAS Communications Network, Inc.	http://www.satexas.com	This company services businesses and is an IT consultant, not a qualified broadband provider.
409	SC TXLINK, LLC.	n/a	Confirmed with company that they do not provide broadband internet services of any kind.
410	Seneca Communications, LLC	http://senecacommunications.com	This company offers business internet solutions only.
411	Servisense.com, Inc.	n/a	Inactive; no longer in business; telephone number-disconnected status; inactive URL.
412	Signatel Telephone Corp	n/a	Company indicated they are facilities-based and reseller for residence and commercial and work through PUC to provide required information only.
413	Simply Cellular & Telephone Reconnections, LLC	n/a	Inactive; no longer in business; logged telephone number assigned to another business firm; inactive URL.
414	Simply Dialup A Metrogeek Company	http://www.simplydialup.com/	Company offers only dial-up services.
415	SkyvueUSA	http://www.skyvueusa.com	Acquired by ERF Wireless.
416	Sling Broadband	http://www.slingbroadband.com/	Service provider in Broward and Dade County, Florida.

417	Smartcom Telephone, LLC	http://www.smartcomtelephone.com/	Commercial broadband provider, does not service a residential market with broadband.
418	Smartresort Co, LLC	www.discoverbeyond.com; http://www.smartresort.com;	General reseller; multi-state provider.
419	Soft Switch Communications Inc.	http://softswitchcom.com/	This company is a business telecommunications service provider and is not a broadband service provider.
420	Solarity Communications LLC	n/a	Inactive; no longer in business; continuous busy signal with logged telephone number; inactive URL; e-mail, Microsoft delivery rejection.
421	South Texas Internet	http://www.stic.net/	This company is a business telecommunications service provider and is not a broadband service provider.
422	Southwestern Bell Telephone, L.P.	n/a	Acquired by AT&T, Inc.
423	Southwestern Network Communications, Inc.	n/a	No longer operating; this company was a facilities-based reseller.
424	Speed Cell Communications	n/a	This company is no longer in business.
425	Speed Express Networks	http://speedexpress.net	This company is no longer in business.
426	Spindlemedia	http://www.spindle.net	This company offers no broadband services.
427	Sprint Broadband Direct	http://www.broadbandreports.com/shownews/ Sprint-Broadband-Direct-Goes-Offline-July-31-94556	This company is no longer in business.
428	Stamford Community Network		Inactive; no longer in business; provider sold network assets in August 2012.
429	Starlight Phone, Inc.	n/a	This company offers local phone service only.
430	Stealthwave, LLC	http://www.stealthwave.net	This company's identified speeds do not meet FCC broadband specifications.
431	Stellar Communication, Inc.	http://stellarcommunications.info	This company is no longer in business.

432	Stratos Global Services, Inc.	n/a	This company offers business internet solutions only.
433	Summit Communications	http://suminet.net	Not a state provider for broadband services.
434	Sunray	n/a	This company is not a viable broadband provider, no service offerings found.
435	Sunset Cablevision	n/a	This company is no longer in business.
436	Superior Phone Company, Inc.	n/a	This company was acquired and now operates under D&B Payphone as payphone servicer.
437	Sure-Tel, Inc.	n/a	This company is no longer in business.
438	Surferz.Net	http://www.surferz.net/	This company offers dial-up service.
439	SurfsideTX.Net	http://www.surfsidetx.net	This company's identified speeds do not meet FCC broadband specifications.
440	SurfTX	n/a	This company is no longer in business.
441	Symtelco, LLC	http://symtelco.com	This company, formerly a consulting firm, is no longer in business.
442	T1 Shopper	http://www.t1shopper.com/	This company provides backhaul and is not a broadband provider.
443	T3 Wireless	http://www.t3wireless.com/	This company does not provide residential service, only B2B.
444	Tel West Network Services Corporation	http://www.telwestservices.com	Acquired by TelePacific.
445	Telcentris Communications, LLC	http://www.telcentris.com	Business solutions provider only.
446	Telcove	n/a	This company offers business internet solutions only.
447	Telefamilia Communications, Inc.	http://www.atsi.net/	This company was acquired by ATSI Communications.

448	Telefonos De Tejas, Inc.	n/a	This company offers telephone service only.
449	Telenational Communications Inc.	http://www.telenational.net	Not a broadband provider per a company representative.
450	Tele-One Communications, Inc.	http://www.tele-onecom.com/	This company offers dial-up service.
451	TeleShare Wireless	http://www.teleshare.net/	Acquired by Internet America Wireless.
452	Teligent Services, Inc.	http://www.teligent.com	Not a broadband service provider; voice service only.
453	Telscape Communications, Inc.	http://www.telscape.com/	Not a broadband provider; consulting firm only per a representative of the company.
454	Telson Communications, Inc.	n/a	This company is no longer in business.
455	Terra Com Inc.	n/a	This company is an environmental consulting firm in Marianna, Florida.
456	Texas Air Net	n/a	This company operates as housing directory assistance.
457	Texas American	n/a	This company is no longer in business.
458	Texas Networking, Inc.	n/a	Texas PUCT report identifies no services available in Texas.
459	Texas One Internet	http://tex1.net	Dial-up service provider; no broadband capabilities.
460	Texas Unwired Networks	n/a	Acquired by Internet America Wireless.
461	Texas Web Networks	n/a	This company is no longer in business.
462	THE PHONE PROS	http://www.phonepro.com/	This company is no longer in business.
463	Tiagris Corporation	http://www.tiagris.net/	This company is no longer in business.

464	Tieless Communications	http://tieless.net/	This company is no longer in business.
465	TIM RON ENTERPRISES, LLC.	n/a	Not a broadband provider; local and long distance service only.
466	TMC Communications	http://www.tmccom.com/	Not a broadband provider; VoIP services.
467	TNCI, Inc.	http://www.tncii.com/	No residential services available; B2B provider.
468	TopGun Telecom	n/a	Acquired by Internet America Wireless.
469	TopMost Connects, Inc.	n/a	No longer in business; representative of the company stated the organization has been out of business for 5 or 6 years.
470	Total Access Networks, Inc.	http://www.totalaccess.net/	Not a wisp; website reflects it is a reseller.
471	Total Telephone Service Company	http://www.totaltelephone.com/	This company offers voice services only.
472	Trinsic Communications, Inc.	http://www.trinsic.com/main.asp	Not a broadband provider based on LinkedIn information; telephone number disconnected; no responses to e-mails.
473	TSISP.NET	www.tsisp.net	This company is no longer in business.
474	TSTAR Internet	http://www.tstar.net/wireless_service.htm	Acquired by ERF Wireless.
475	Twilight Communications	http://www.twilightcommunications.com	Acquired by JAB Wireless.
476	TXK Communications, Inc.	n/a	Inactive; no longer in business; invalid contact information.
477	UCN, Inc.	http://www.incontact.com/	Not a broadband provider; long-distance and calling card services.
478	Unidial Communications	www.lightyear.net	This company was acquired by Lightyear.
479	Universal Telephone Exchange, Inc.	n/a	This company is no longer in business.

480	University Corporation for Advanced Internet Development	n/a	This is a community anchor institution network.
481	UNUM Telecommunications, Inc.	http://www.utinet.net/	This company is no longer in business.
482	UrNet	http://www.urnet.net/	Acquired by Digital Passage.
483	US Cable Corporation	http://www.uscablegroup.com/	Acquired by another company.
484	US LEC COMMUNICATIONS Inc.	http://www.paetec.com/	This company is a reseller of frame relay services and does not qualify as a broadband provider.
485	US Wireless Online	n/a	This company was purchased by iElement and is no longer in business.
486	USA Airnet, Inc.	www.usaairnet.com	This company is no longer in business.
487	USA Online, Inc.	http://www.usaonline.net/	This company was acquired by Whitehorse.
488	USA QUICK PHONE, Inc.	n/a	This company is no longer a general reseller of broadband.
489	USTelecom	http://www.ustelecom.org/Video_Blogs/Broadband-Now.html	Inactive; no longer in business.
490	U-Talk Corporation	n/a	Not a broadband provider; PUCT CLEC report identifies POTS services only.
491	Utopian Wireless Corporation	http://www.utopianwireless.com/index.html	Not a broadband provider; provider built networks to meet FCC substantial service requirements.
492	V3 Global, Inc.	n/a	This company is no longer a general reseller of broadband.
493	Valley Telecom Group, Inc.	http://www2.vtc.net/	This company is a reseller of phone services only.
494	Vantage Systems	n/a	This is a software company.
495	VCI COMPANY	n/a	This company is a Comcast affiliate.

496	VCOM SOLUTIONS	http://www.vcomsolutions.com/	Not a broadband provider.
497	Vectren Communications Services, Inc.	http://www.vectren.com/	This company is a national gas company and not a qualified broadband provider.
498	Vertex Communications, Inc.	n/a	This company offers dial-up service.
499	Viteris, Inc.	n/a	Acquired by Internet America Wireless.
500	Viyu Communications	n/a	This company is no longer in business.
501	Voice Runner, Inc.	http://www.voicerunner.com/	This company is not a broadband provider.
502	VoicePaq Prepaid, LLC	n/a	Not a broadband provider.
503	VOLO COMMUNICATIONS OF TEXAS, Inc.	http://www.volocommunications.com/	No longer in business.
504	VSS Wireless	n/a	This company is no longer in business.
505	Warp Speed Internet	n/a	Acquired by ERF Wireless.
506	Wave2Wave Communications Inc.	http://www.wave2wave.com	This company does not have a footprint in TX and only operates in NY. CT, NJ, IL, and PA.
507	Waymark Communications	http://www.waymark.net/	Website research indicates a business to business service provider.
508	WCS Communications	n/a	General Reseller; non-facilities based; satellite services.
509	WDSL Net	n/a	This company is no longer in business.
510	Webatron Internet Solutions	http://www.webatron.net	This company is no longer in business.
511	Webcheetah	n/a	This company is a web design firm.

512	WEST TELCOM, Inc.	n/a	This company operated in California and is no longer in business.
513	West Texas Internet Services	n/a	This company is no longer in business.
514	West Texas Online	n/a	This company is no longer in business.
515	WhiteHorse Communications	http://www.net	This company offers dial-up service only.
516	Winstar Communications, LLC	http://gvcwinstar.net/	This company is no longer in business.
517	Wireless Frontier	n/a	This company is no longer in business.
518	Wireless Roanoke, Inc.	http://www.wirelessroanoke.com/	This company is no longer in business.
519	Wireless TelCorp	http://www.wirelesstelcorp.com	This company, formerly serving businesses, is no longer in business.
520	Wirestar, Inc.	http://www.wirestar.net/	This company is not a broadband provider.
521	WireWeb	http://www.wireweb.net	Acquired by Internet America Wireless.
522	wisbin	http://www.wisbin.com/	This company is no longer in business.
523	Wi-Speed	n/a	This company is no longer in business.
524	World Link Communications	n/a	This company offers dial-up service only.
525	WTX Communications	n/a	This company is no longer in business.
526	www.AmericanAngel.us	http://www.americanangel.us/	This company is no longer in business.
527	Xanadoo, LLC	http://www.xanadoo.com	This company is no longer in business; under bankruptcy filings.
528	Xramp Wireless	n/a	This company was acquired by Wireless Frontier.

529	Xspedius Management Co. Switched Services, L.L.C	n/a	This company and web-hosting was acquired by Time-Warner.
530	YEYZOO.NET	http://www.yeyzoo.net/	This company is no longer in business.
531	YFT.Net	http://www.yft.net	Acquired by AMA Technologies, Inc.
532	YLISP (Your Local ISP)	http://www.itsyournet.com	General reseller; multi-state provider.
533	YourT1Wifi.com	http://yourt1wifi.com/	This company does not service the Texas market and is an Idaho WISP.
534	ZOOM Internet Services, LLC	n/a	This company does not service the Texas market and is a Michigan WISP.

APPENDIX A: ESTIMATION OF NON-PARTICIPATING PROVIDERS

Gecko Inter.net

Indian Creek Internet

Terral Telephone Company

VOWnet

WesTex Connect Internet

GECKO INTER.NET, INC.

As part of its ongoing broadband mapping efforts, Connected Nation (CN) has developed a series of processes with the goal of submitting mapping data to NTIA for every known and qualifying last-mile broadband provider, regardless of whether the provider has chosen to support and participate in the State Broadband Initiative (SBI) mapping program.

The following narrative provides detail regarding the recent data collection activities related to Gecko Inter.Net, Inc., (Gecko) a wireless Internet service provider (WISP) located in Corpus Christi, Texas, with its service area in San Patricio County and Nueces County in southeastern Texas. This narrative will include information regarding how and where CN obtained publicly available data, and the on-the-ground due diligence, verification, and validation techniques that support the resulting broadband coverage estimate.

Background

CN staff members have attempted to obtain the participation of the provider with at least 25 recorded instances of communication via telephone and e-mail from September 3, 2009, through December 10, 2012. A CN representative also personally visited the provider's office in Calallen, Texas on January 11, 2013, to discuss the broadband mapping project; however, a company representative said the owner was still unwilling to participate.

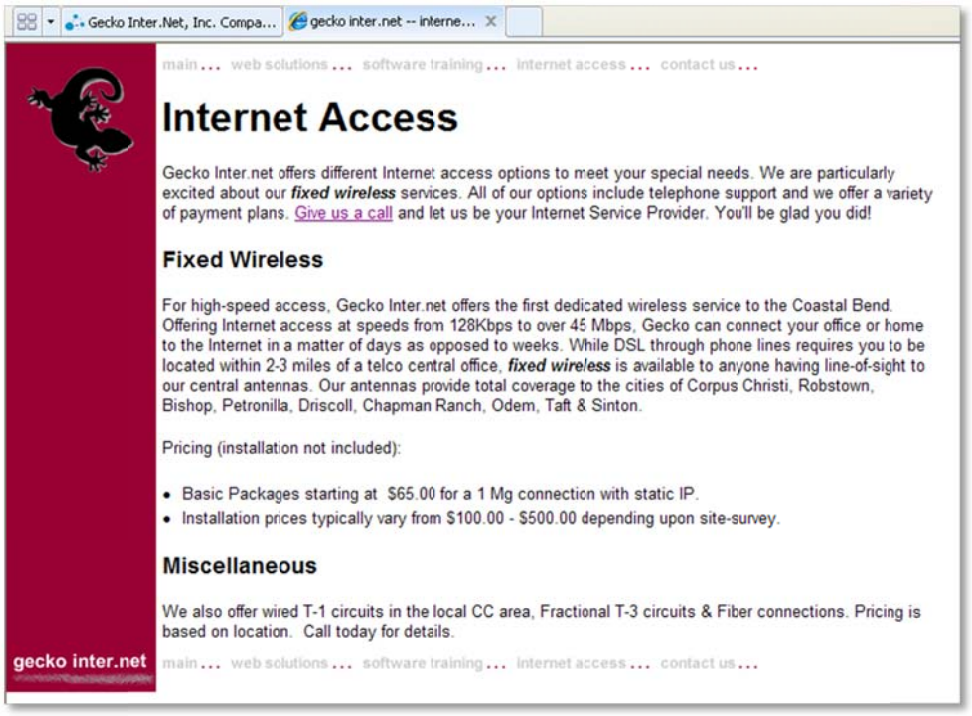
The Issue

Connected Nation has been unable to obtain Gecko's broadband coverage information through typical outreach efforts, and the provider continues to refuse to participate in the Connected Texas broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN began building a file based on research information and, as time progressed, enriched the file with information obtained through the public domain. As a first step, CN reviewed the provider's website (http://www.geckointer.net/main.html) to determine the residential service plans and service area advertised for the provider's wireless network (**Exhibit A**). The website's speed information is inconsistent stating in one reference that the lowest speed is 128 kbps, while on another line, stating that the pricing plans start with 1Mbps service. For the service area, the provider's website lists several cities and towns to which it provides "total" fixed wireless coverage.

Exhibit A: Advertised Service Plans



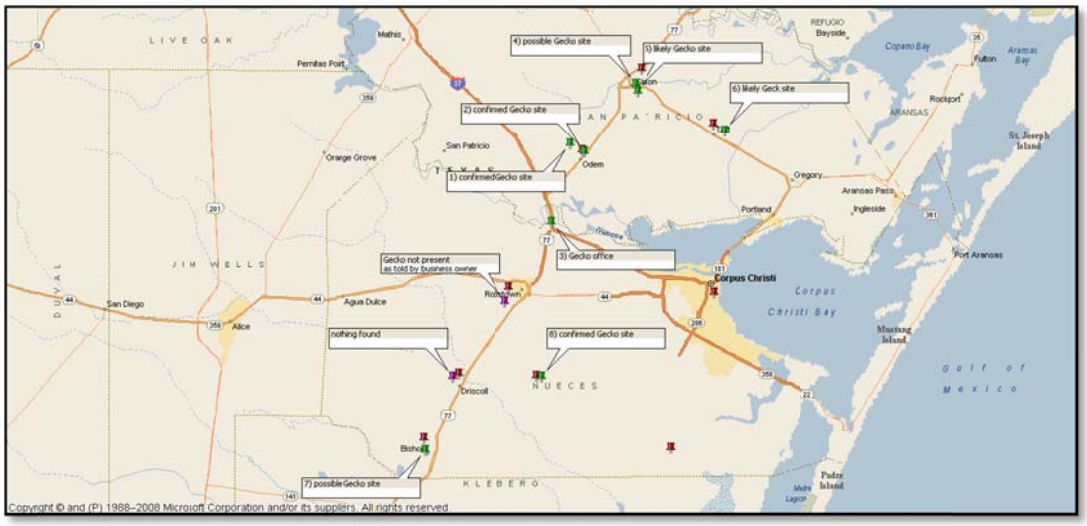
A search for a Federal Registration Number (FRN) on the FCC **CO**mmission **RE**gistration **S**ystem (CORES) system yielded no FRN, and no licenses were found on the FCC's Universal Licensing System (ULS) which could be attributed to the provider. A business registration (**Exhibit B**) was found in on-line records from the Texas Secretary of State.

Exhibit B: Business Registration

Preliminary Identification of Provider's Coverage Area

Utilizing location information from the provider's website, and through other on-line research, a CN staff member identified target search areas for field research. The nine communities identified by the provider's website as being served by wireless service are shown in **Exhibit C** as **red** pushpins.

Exhibit C: Search Targets and Tower Structures

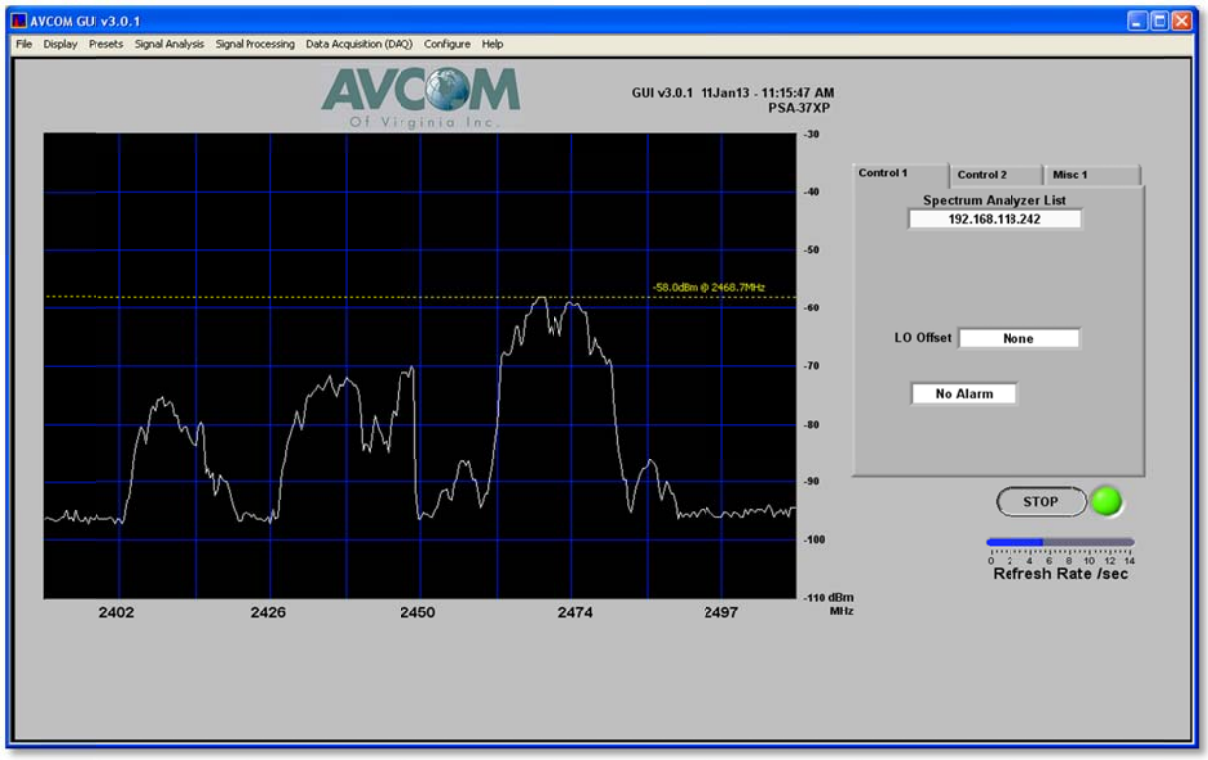


Field Testing Techniques

Having recorded the targeted search areas in Microsoft's *Streets and Trips* mapping application, a team of CN technicians drove to each location and performed signal tests for the detection of active wireless frequencies typically utilized to provide WISP service. The **green** pushpins in Exhibit C above indicate where tower structures were found which were confirmed to have Gecko equipment, or were likely to be Gecko transmitters based on equipment characteristics or frequency tests. Where possible, confirmation of Gecko locations was obtained from local residents and businesses.

The CN technicians were equipped with AVCOM PSA-37XP analyzers with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands. Each validation point was scrutinized for frequency of operation. A screen image of the operating frequency or frequencies was captured (**Exhibit D**), general notes were recorded for each location (e.g., approximate antenna height, frequency of operation, antenna type (omnidirectional or sectored)), and photographs were taken of the transmit sites and wireless access points.

Exhibit D: Frequency Test Data for the Odem, TX Hub Location



Results and Submission for April 2013

Of the numerous locations visited during the validation route, eight access points were identified and relative information was logged into the Connected Nation provider information file for Gecko (**Exhibit E**). A composite propagation study was completed based on the field data (**Exhibit F**). Both documents were forwarded to Gecko, and the provider was advised the information would be submitted to Connected Texas and the NTIA broadband mapping project for processing if there were no discrepancies of the estimated coverage received from the provider within a 48-hour period.

Exhibit E: Field Validation Notes

Wireless Provider Information

Provider Name (Legal entity)	**Gecko Inter.Net, Inc.**
DBA ("Doing Business As") Name	N/A
FRN # (10-digit FCC Registration Number)	N/A

Name of Location	Status	Pop Center	Structure	Latitude	Longitude	Omni?	Radius	Frequency	Gain	Power	Elevation
Whatley	Active	Odem	broadcast tower	27.96247	-97.59917	Yes	8	2400	10	24	120
Planters	Active	Odem	grain elevator	27.95304	-97.57912	Yes	8	2400	10	24	120
Office	Active	Corpus Christi	broadcast tower	27.86730	97.62458	Yes	8	2400	10	24	150
Vineyard	Active	Sinton	cellular tower	28.03556	-97.50920	Yes	8	900	10	24	120
FM 2046	Active	Sinton	broadcast tower	28.02671	-97.50620	Yes	8	900	10	24	150
Taft	Active	Taft	water tower	27.97816	-97.38538	Yes	8	900	10	24	120
Bishop	Active	Bishop	grain elevator	27.58833	-97.79861	Yes	8	2400	10	24	120
Petronila	Active	Petronila	broadcast tower	27.67833	-97.63806	Yes	8	2400	10	24	110

Exhibit F: Gecko Inter.Net, Inc. Composite Coverage

INDIAN CREEK INTERNET SERVICES, INC.

As part of its ongoing broadband mapping efforts, Connected Nation (CN) has developed a series of processes with the goal of submitting mapping data to NTIA for every known and qualifying broadband provider, regardless of whether the provider has chosen to support and participate in the State Broadband Initiative (SBI) mapping program.

The following narrative provides detail regarding the recent data collection activities related to Indian Creek Internet Services, Inc., (Indian Creek) a wireless Internet service provider (WISP) located in Bandera, Texas, with a service area in eastern Bandera County and Medina County, Texas. The narrative will include information regarding how and where CN obtained publicly available data and the on-the-ground due diligence, verification, and validation techniques that support the underlying data.

Background

CN staff members have attempted to obtain the participation of the provider with 47 instances of communication via telephone and e-mail from September 3, 2009, to January 10, 2013. Additionally, a CN staff member visited the Indian Creek office on at least three separate dates to discuss the broadband mapping project in person with the Indian Creek owners, but they would neither volunteer information nor follow-up from the meetings.

The Issue

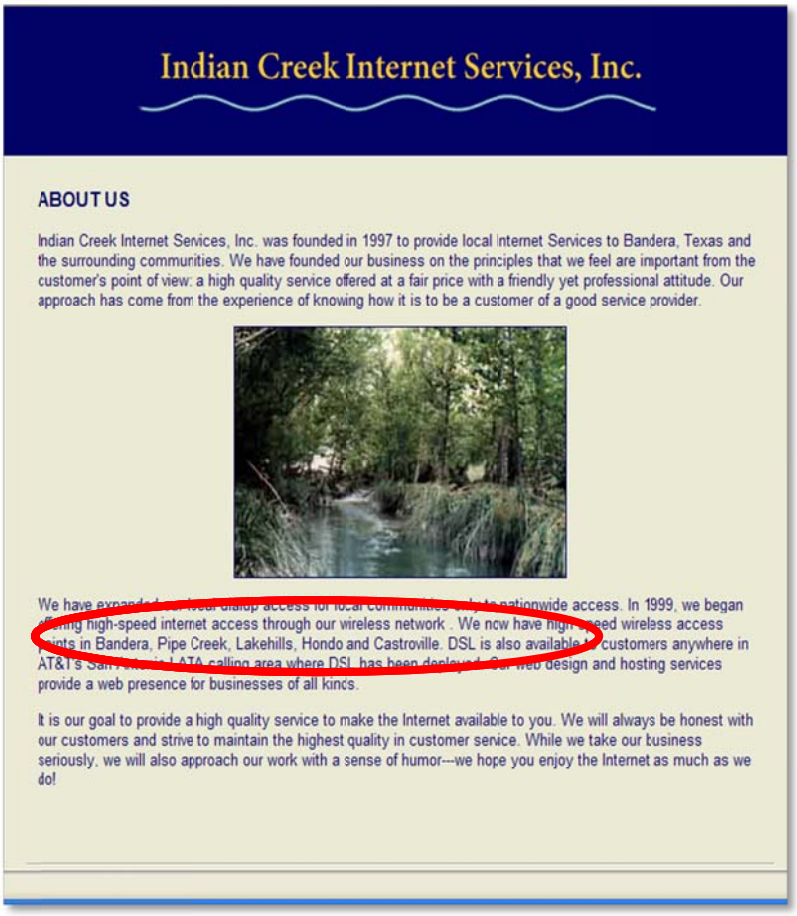
Indian Creek, by its lack of responsiveness since September 3, 2009, has established its unwillingness to participate in the Connected Texas broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN has built a file of research material based on information obtained through the public domain. For example, CN reviewed the provider's website (www.indian-creek.net) to determine the residential service plans and the service area of the provider's wireless network. The website does not provide Internet speed information, and the only reference to a price states: "Monthly prices start at $39.95."

The provider's website also does not specify a coverage or service area in map form, but instead lists five communities that it serves (**Exhibit A**). A telephone call to the main office number yielded inconsistent information, with the owner stating that the provider only offered service in two of the five communities. A wireless customer in a third community, however, confirmed Indian Creek service at the customer's home.

Exhibit A: Service Area



Indian Creek Internet Services, Inc.

ABOUT US

Indian Creek Internet Services, Inc. was founded in 1997 to provide local Internet Services to Bandera, Texas and the surrounding communities. We have founded our business on the principles that we feel are important from the customer's point of view: a high quality service offered at a fair price with a friendly yet professional attitude. Our approach has come from the experience of knowing how it is to be a customer of a good service provider.

We have expanded [illegible] to nationwide access. In 1999, we began offering high-speed internet access through our wireless network . We now have high-speed wireless access points in Bandera, Pipe Creek, Lakehills, Hondo and Castroville. DSL is also available to customers anywhere in AT&T's San Antonio LATA calling area where DSL has been deployed. Our web design and hosting services provide a web presence for businesses of all kinds.

It is our goal to provide a high quality service to make the Internet available to you. We will always be honest with our customers and strive to maintain the highest quality in customer service. While we take our business seriously, we will also approach our work with a sense of humor---we hope you enjoy the Internet as much as we do!

A search for a Federal Registration Number (FRN) for the provider on the FCC **CO**mmission **RE**gistration **S**ystem (CORES) using the company business name yielded 0016239758 (**Exhibit B**). Also, to support field validation of possible transmit sites and/or wireless access points, the FRN was referenced against the FCC Universal Licensing System (ULS) to identify any authorizations that the provider may hold for licensed spectrum or lease agreements which could assist in specifying wireless access points for the service area. This process yielded license a 3650 MHz authorization for Station WQJY667 (**Exhibit C**) however, no locations were registered.

Exhibit B: Federal Registration Number

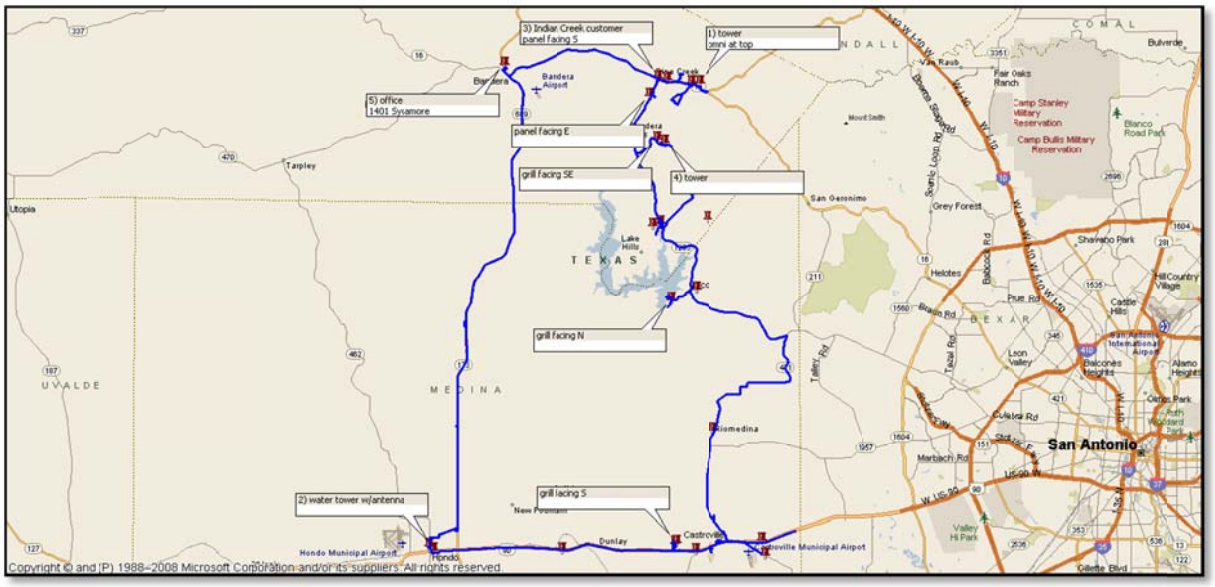
Registration Detail	
FRN:	0016239758
Registration Date:	03/19/2007 03:48:00 PM
Last Updated:	09/18/2009 05:07:59 PM
Business Name:	Indian Creek Internet Services, Inc.
Business Type:	Private Sector , Corporation
Contact Organization:	ICIS
Contact Position:	President
Contact Name:	Mr Everett M McCurdy
Contact Address:	POB 1565 1401 Sycamore St. Bandera, TX 78003-1565 United States
Contact Email:	mmmm@indian-creek.net
ContactPhone:	(830) 796-7788
ContactFax:	

Exhibit C: WQJY667 FCC License Information for Call Sign WQJY667

Testing Techniques

Because Connected Nation was unable to (a) extract a service area map from the provider's website and (b) identify licensing information through the FCC ULS database, alternate methods were required to identify and to confirm tower sites for the provider. A CN technician drove hundreds of miles throughout the targeted communities seeking wireless transceivers, triangulating the transmission paths of those receivers to pinpoint tower locations, conducting interviews with wireless Internet customers, and performing directional frequency tests. Utilizing Microsoft's *Street and Trips* software, the field research results are depicted in **Exhibit D**.

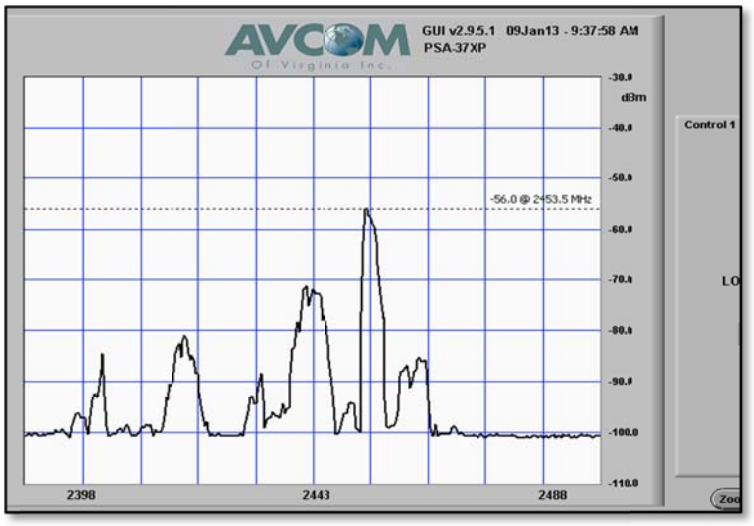
Exhibit D: Validation Points for AP Structures



Dozens of points of research were visited, with many mapped and documented, as illustrated with the pushpins in the exhibit above. Only a few served as confirmation of the provider's tower locations. Where possible, the CN technician confirmed through a third party that the tower location was being utilized by Indian Creek. One example is the confirmation of the water tower in Hondo by an Indian Creek Internet customer.

The CN technician was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands. Each validation point was scrutinized for frequency of operation. A screen image of the operating frequency or frequencies was captured (**Exhibit E**), general notes were recorded for each location – e.g., approximate antenna height, frequency of operation, antenna type (omnidirectional or sectored) – and photographs were taken of the access points.

Exhibit E: Frequency Test Data for the Hondo Water Tower Location



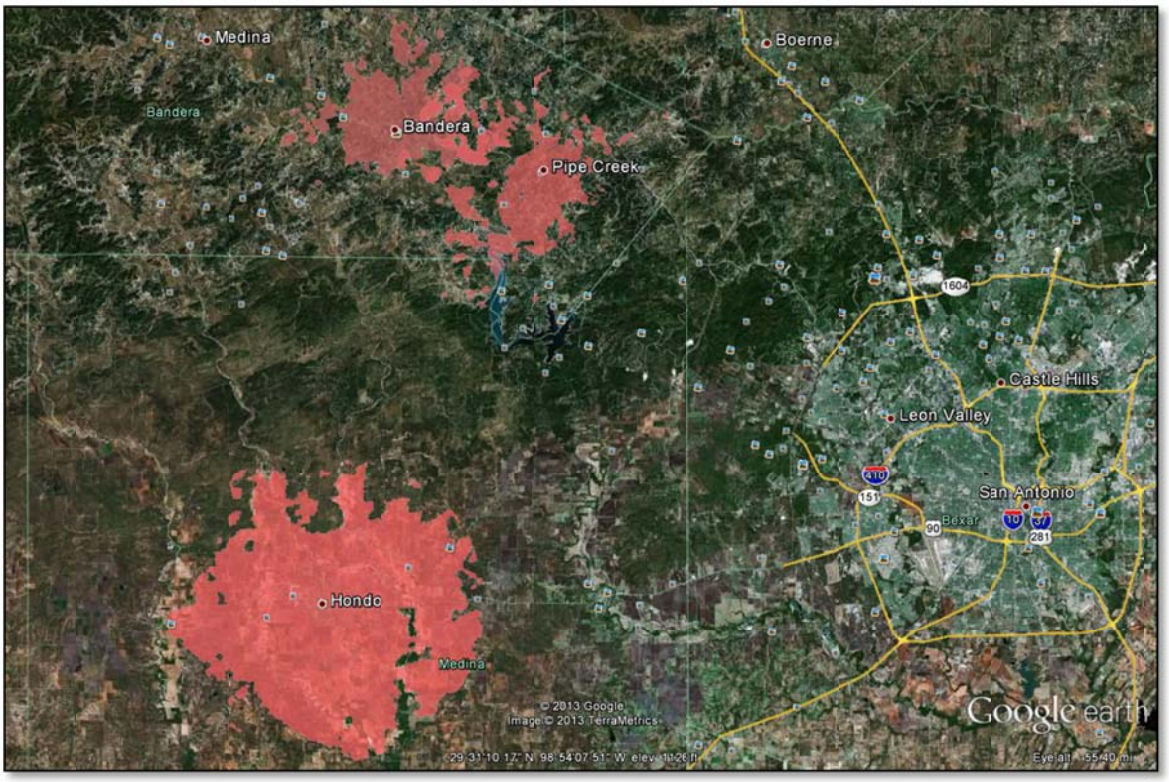
Results and Submission for April 2013

Of the numerous locations visited during the validation route, three access points were identified and relative information was logged into the Connected Nation provider information file for Indian Creek (**Exhibit F**). A composite propagation study was completed based on the field data (**Exhibit G**). Both documents were forwarded to Indian Creek, and the provider was advised the information would be submitted to Connected Texas and the NTIA broadband mapping project for processing if there were no discrepancies of the estimated coverage received from the provider within a 48-hour period.

Exhibit F: Field Validation Notes

Wireless Provider Information											
Provider Name (Legal entity)	Indian Creek Internet Services, Inc.										
DBA ("Doing Business As") Name											
FRN # (10-digit FCC Registration Number)	0016239758										
Name of Location:	**Status**	**Pop Center**	**Structure**	**Latitude**	**Longitude**	**Omni?**	**Radius**	**Frequency**	**Gain**	**Power**	**Elevation**
Office	Active	Bandera	rooftop	29.73144	-98.07497	Yes	8	2400	12	26	40
Pipe Creek	Active	Pipe Creek	tower	29.67010	-98.92878	Yes	8	2400	12	26	100
Hondo	Active	Hondo	water tower	29.34650	99.13868	Yes	8	2400	12	26	150

Exhibit G: Indian Creek Internet Services, Inc. Composite Coverage



TERRAL TELEPHONE COMPANY

As part of its ongoing broadband mapping efforts, Connected Nation (CN) has developed a series of processes with the goal of submitting mapping data to NTIA for every known and qualifying last-mile broadband provider, regardless of whether the provider has chosen to support and participate in the State Broadband Initiative (SBI) mapping program.

The following narrative provides detail regarding the recent data collection activities related to Terral Telephone Company (TTC), d.b.a. Wavelinx, a wireless Internet service provider (WISP), located in Oklahoma City, Oklahoma, with a service area around Nacona and Ringgold, Texas. The narrative will include information regarding how and where CN obtained publicly available data and the on-the-ground due diligence, verification and validation techniques that support the underlying data.

Background

CN staff members have continued trying to obtain the participation of the provider with 30 instances of communication via telephone and e-mail sessions since February 17, 2010, through February 16, 2013. The last communication reply was received from a company representative on November 2, 2011, with a response of "electing not to participate." Since that time the provider has been non-responsive to all outreach communication attempts.

The Issue

TTC, by its lack of responsiveness since November 2, 2011, has predicated its unwillingness to participate in the Connected Texas broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN began building a file based on research material and, as time progressed, enriched the file with information obtained through the public domain. For example, CN reviewed the provider's website (www.wavelinx.net) to determine the residential service plans **(Exhibit A)** and the service area **(Exhibit B)** of the provider's wireless network. A search for a Federal Registration Number (FRN) on the FCC **CO**mmission **RE**gistration **S**ystem (CORES) system yielded an FRN of 0004320412 **(Exhibit C)** with contact information relative to the accounting manager of the company. Also, to support field validation of transmit sites and wireless access points, the FRN was referenced against the FCC Universal Licensing System (ULS) to identify any authorizations that the provider may hold for licensed spectrum or leasing arrangements which could possibly enhance locating active transmit sites and/or wireless access points for the service area. This process yielded no additional FCC related data **(Exhibit D).**

Exhibit A: Service Plans

Rates/Service Areas

WaveLinx has various packages to get you online and surfing. Please review the following packages and find which one is the best fit for you.

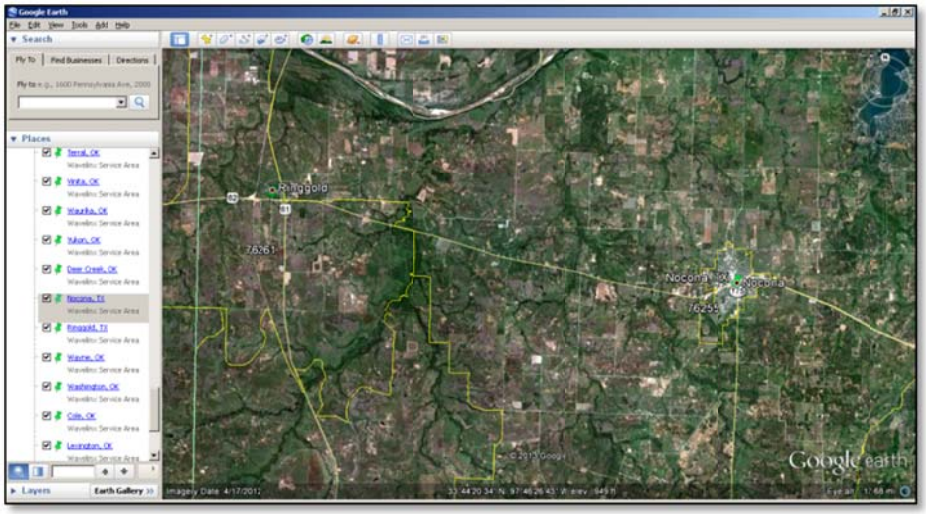
Current Wavelinx subscribers, receive a FREE months service by referring a friend. Ask one of our associates for complete details.

Special Promotions - click to find out.

Amped Rate Plans

FEATURES	NOTHING BUT AIR	DROP-IN	LONG BOARD	HANG FIVE	HIGH TIDE	TSUNAMI
	$175 Deposit on Air Card				Includes Static IP, Wireless Router, & Prioritized Data	
COST	$29.95/mo	$39.95/mo	$49.95/mo	$59.95/mo	$69.95/mo	$89.95/mo (plus)
Activation Fee	$25	$25	$25	$25	$25	$25
Speed*		1.5 Mbps down 768 kbps up	3 Mbps down 1 Mbps up	5 Mbps down 1.5 Mbps up	5 Mbps down 2.5 Mbps up	Maximized Data Rate Custom Quotes
Connect/Devices		2	3	1	9	12
E-mail Addresses			3	1	15	20

Exhibit B: Service Area



WaveLinx is proud to serve the following communities with high-speed wireless Internet service. Please review our Terms and Conditions page for more information.

Service Areas - Click here to view a map of our service area.

OKLAHOMA Locations

Adair	Grand Lake Towne	Pryor
Addington	Grove	Ryan
Afton	Jay	Slaughterville
Arcadia	Jones	Spavinaw
Bernice	Ketchum	Spencer
Big Cabin	Langley	Sugden
Chelsea	Lexington	Terral
Cleora	Monkey Island	Vinita
Cole	Noble	Washington
Deer Creek	Norman	Waruka
Disney	Oklahoma City	Wayne
Edmond	Pensacola	Yukon
Euchi	Piedmont	
Goldsby	Purcell	

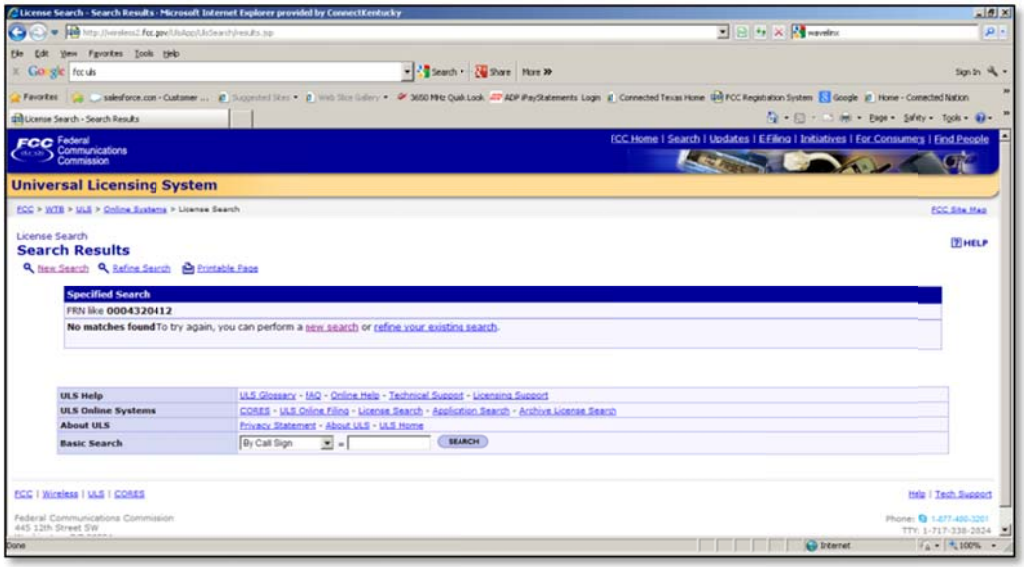
Texas Locations

Nocona, TX
Nocona Lake, TX
Prairie Valley, TX
Ringgold, TX

Exhibit C: Federal Registration Number

Registration Detail	
FRN:	0004320412
Registration Date:	03/14/2001 06:38:38 PM
Last Updated:	08/30/2011 01:40:00 PM
Business Name:	Terral Telephone Company
Business Type:	Private Sector , Corporation
Contact Organization:	Terral Telephone Company
Contact Position:	Accounting Manager
Contact Name:	Cathy Obomy
Contact Address:	111 Harrison Ave. Ste. LL-001 Oklahoma City, OK 73104-1816 United States
Contact Email:	cathy@ttslinx.com
ContactPhone:	(405) 602-2410
ContactFax:	(405) 842-1785

Exhibit D: FCC ULS License Search



Preliminary Identification of Provider's Coverage Area

Connected Nation extracted the TTC Google Earth KMZ service area map from the provider's website. The Google Earth KMZ service area map was utilized to view street level detail (satellite imagery) at the pin placements to identify possible transmit sites and wireless access point structures (such as rooftops) serving the Nacona **(Exhibit E)** and Ringgold communities. The preliminary process identified candidate structures for field observations. The provider's service area depiction is represented by push pins as shown in **Exhibit B and E**. Both locations were entered into Microsoft *Streets & Trips* mapping application **(Exhibit F)** to develop a route for the validation process.

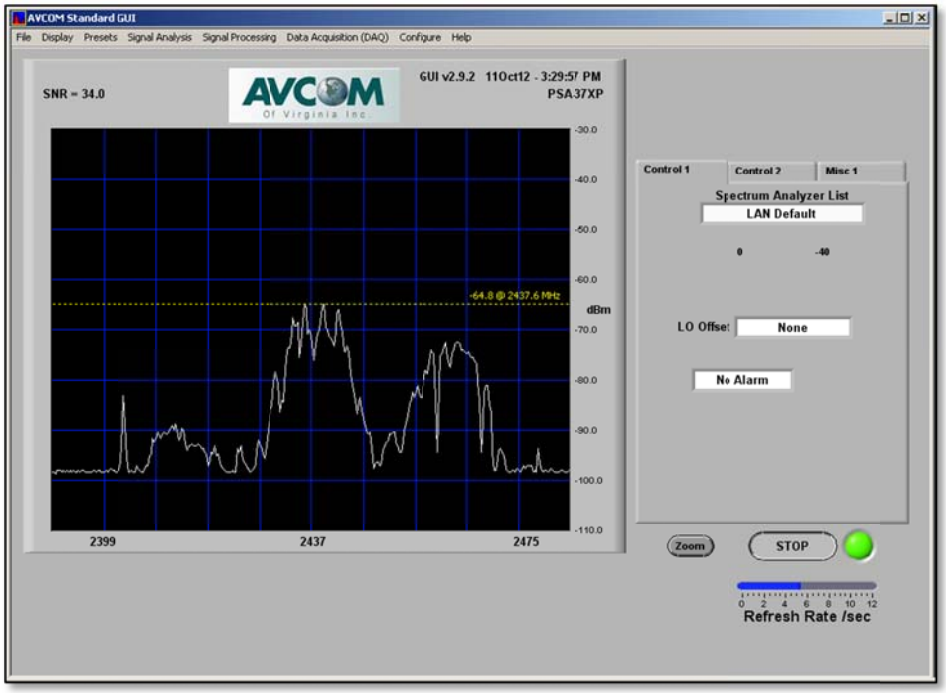
Exhibit E: Google Earth: Terral Telephone Company (Wavelinx) Nacona, Texas Service Area Reference Point

Exhibit F: Validation Points for AP Structures

Testing Techniques

Connected Nation staff developed a site validation route based on data established with the provider's Google Earth KMZ service area. The CN wireless engineer was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands **(Exhibit G)**. Each service area was scrutinized for frequency of operation. A screen image of the operating frequency (or frequencies) was captured; general notes were recorded for each location-approximate antenna height, frequency of operation, antenna type (omnidirectional or sectored), and photographs were taken of the access points.

Exhibit G: Field Data for Terral Telephone Company (Wavelinx) FM103 Location



Provider	Location	Latitude	Longitude	Frequency Availability				Structure	Approximate Antenna Height	Notes
				900MHz	2.4GHz	3.65GHz	5.0GHz			
Terral Telephone (Wavelinx)	Nacona Service Area	33 47 14N	97 43 38W							Service availabity per Wavelinx website.
Terral Telephone (Wavelinx)	FM 106	33 47 58N	97 43 53W		X			Guyed Rohn	90ft.	2 120 degree sectors; 20/180 degree azimuth; approximately 90ft.

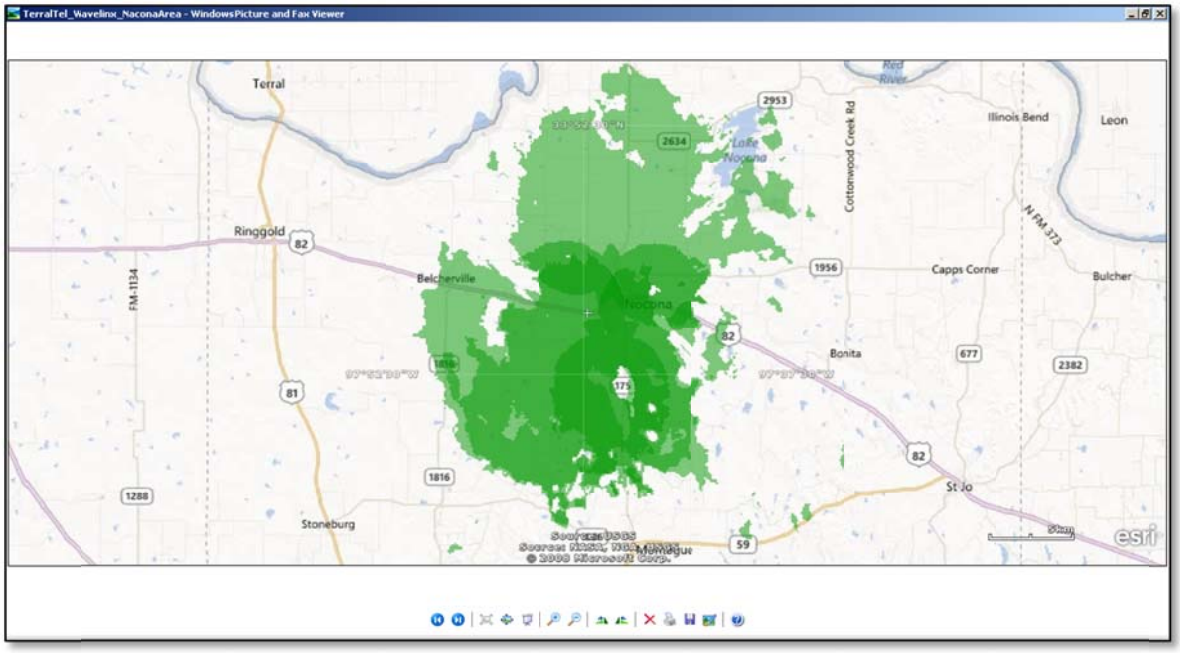
Results and Submission for April 2013

Of the two service areas visited during the validation point route, two access points were identified and relative information was logged into the TTC field validation notes file **(Exhibit H)**. The field and the publicly available data were transferred to the Connected Nation provider information file. A composite propagation study was completed based on the field data **(Exhibit I)**. Both documents were forwarded to TTC and advised the information would be submitted to Connected Texas and the NTIA broadband mapping project for processing if there are no discrepancies of the estimated coverage received from the provider within a 48-hour period.

Exhibit H: Field Validation Notes

Provider	Location	Latitude	Longitude	Frequency	Structure	Approximate Antenna Height	Notes
				2.4GHz			
Terral Telephone (Wavelinx)	Nacona Service Area	33 47 14N	97 43 38W				Service availabity per Wavelinx website.
Terral Telephone (Wavelinx)	FM 106	33 47 58N	97 43 53W	X	Guyed Rohn	90ft.	2 120 degree sectors; 20/180 degree azimuth; approximately 90ft.
Terral Telephone (Wavelinx)	Hwy 82	33 47 6N	97 44 0W	X	Guyed Rohn	80ft.	2 120 degree sectors; 120/240 degree azimuth; approximately 80ft.
Terral Telephone (Wavelinx)	Ringgold Service Area	33 49 22N	97 56 46W				Service availability per Wavelinx website. No RF detection or CPE/access point observations.

Exhibit I: Terral Telephone Company (Wavelinx) Composite Coverage



VOWNET

As part of its ongoing broadband mapping efforts, Connected Nation (CN) has developed a series of processes with the goal of submitting mapping data to NTIA for every known and qualifying last-mile broadband provider, regardless of whether the provider has chosen to support and participate in the State Broadband Mapping (SBI) mapping program.

The following narrative provides detail regarding the recent data collection activities related to The Media Cottage, Inc., a wireless Internet service provider (WISP) doing business as VOWnet (VOW) in Wimberley, Texas, with its service area in Hays County in central Texas. This narrative will include information regarding how and where CN obtained publicly available data, and the on-the-ground due diligence, verification and validation techniques that support the underlying data.

Background

CN staff members have attempted to obtain the participation of the provider with at least 10 recorded instances of communication via telephone and e-mail from May 25, 2012, through December 10, 2012. Additionally, a CN staff member visited the VOW office on three separate occasions to discuss the broadband mapping project in person with VOW staff but a representative was not available.

The Issue

VOW, by its lack of responsiveness since May 25, 2012, has predicated its unwillingness to participate in the Connected Texas broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN began building a file based on research material, and as time progressed, enriched the file with information obtained through the public domain. For example, CN reviewed the provider's website (www.vownet.net) to determine the residential service plans and the service area advertised for the provider's wireless network. Although no specific broadband speed was identified, the website states: "VOWnet offers Wimberley area residents a new type of wireless technology that is comparable to T1 speeds." Pricing for the residential service is illustrated in **Exhibit A**.

Exhibit A: Advertised Service Plans

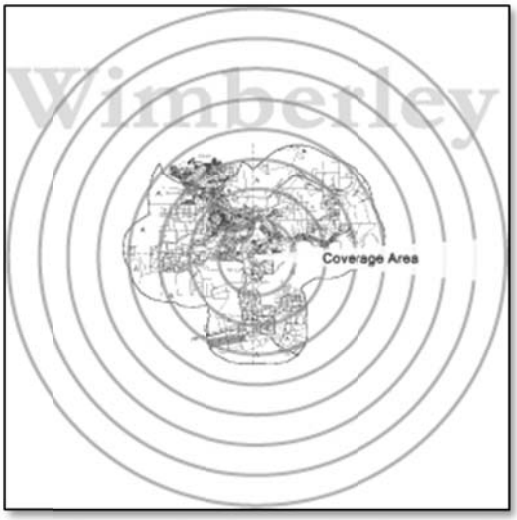
VOWnet - Village Of Wimberley Community Network

Home | About Us | FAQ | Rates | AUP | Email | Specials | Links | Contact Us | Virus Advisory

VOWnet Pricing Schedule

Product/Service	Purchase	Rental*	Notes
Residence / Small Business			**Service for up to five computers**
Broadband Internet Access	$45.00/Mo		$495.00 per year with annual prepay — One Month Free!
Basic Equipment Package	$300.00	$25.00/Mo	Includes radio, window antenna, connection for one computer. Package designed for self-installation (when close to transmit location)
Typical Equipment Package	$445.00	$35.00/Mo	Radio, enclosure, medium gain antenna, router, roof tripod/mast pole
Installation	$55.00/Hr		

The website also indicates a service coverage area, however, the map is blurred and indistinct.



A search for a Federal Registration Number (FRN) on the FCC **CO**mmission **RE**gistration **S**ystem (CORES) system yielded an FRN of 0018684191 (**Exhibit B**) with company contact information. Also, to support field validation of potential transmit sites and/or wireless access points, the FRN was referenced against the FCC Universal Licensing System (ULS) to identify any authorizations that the provider may hold for licensed spectrum or spectrum leasing arrangements which could assist in specifying active wireless access points for the service area. This process yielded an authorization for a 3650 MHz Station with call sign WQKD739 (**Exhibit C**) with five unique locations.

Exhibit B: Federal Registration Number

Registration Detail	
FRN:	0018684191
Registration Date:	04/11/2009 08:42:00 PM
Last Updated:	
Business Name:	The Media Cottage, Inc.
Business Type:	Private Sector , Corporation
Contact Organization:	The Media Cottage, Inc.
Contact Position:	CEO
Contact Name:	Mr Ed Wood
Contact Address:	151 Las Flores Suite 2 Wimberley, TX 78676 United States
Contact Email:	ed.wood@mediacottage.com
ContactPhone:	(512) 847-8956
ContactFax:	(512) 847-9337

Exhibit C: FCC License Information for Call Sign WQKD739

MAIN | ADMIN | LOCATIONS

Call Sign	WQKD739	Radio Service	NN - 3650-3700 MHz

6 Total Locations
10 Locations per Summary Page

	Location	Latitude,Longitude	Transmitter Azimuth
1	Paradise	29-58-48.0 N, 098-05-15.0 W	332.0 degrees
2	RR12	29-57-16.5 N, 098-05-39.2 W	265.0 degrees
3	RR12	29-57-16.5 N, 098-05-39.2 W	25.0 degrees
4	Tucker	30-10-14.9 N, 098-07-22.5 W	189.0 degrees
5	White Rabbit	30-07-22.6 N, 098-15-52.6 W	360.0 degrees
6	Wossum	30-01-07.2 N, 098-00-56.1 W	360.0 degrees

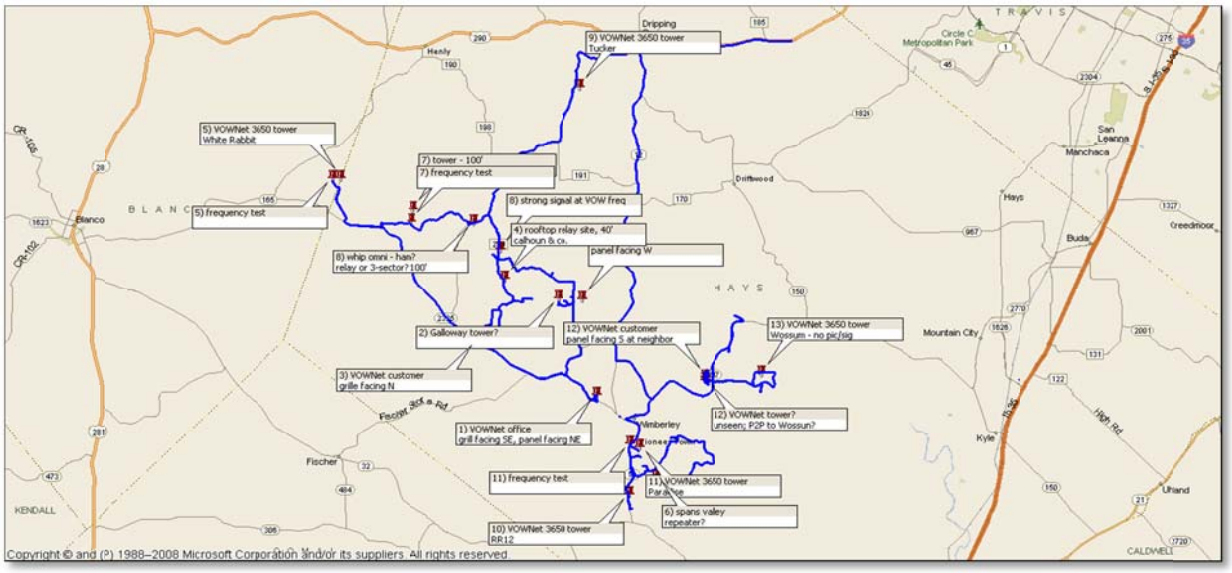
Preliminary Identification of Provider's Coverage Area

Utilizing location information contained in the license for WQKD739, images from the provider's website, and through other research, a CN staff member determined that the five licensed sites probably represented the external boundary locations of the provider's coverage area. Further, in a brief telephone call with a provider representative, the CN staff member was able to learn that the provider utilized 10 to 12 tower sites for its wireless broadband service. The five licensed locations were compiled into a targeted search map for VOW in Microsoft's *Streets and Trips* mapping application.

Field Testing Techniques

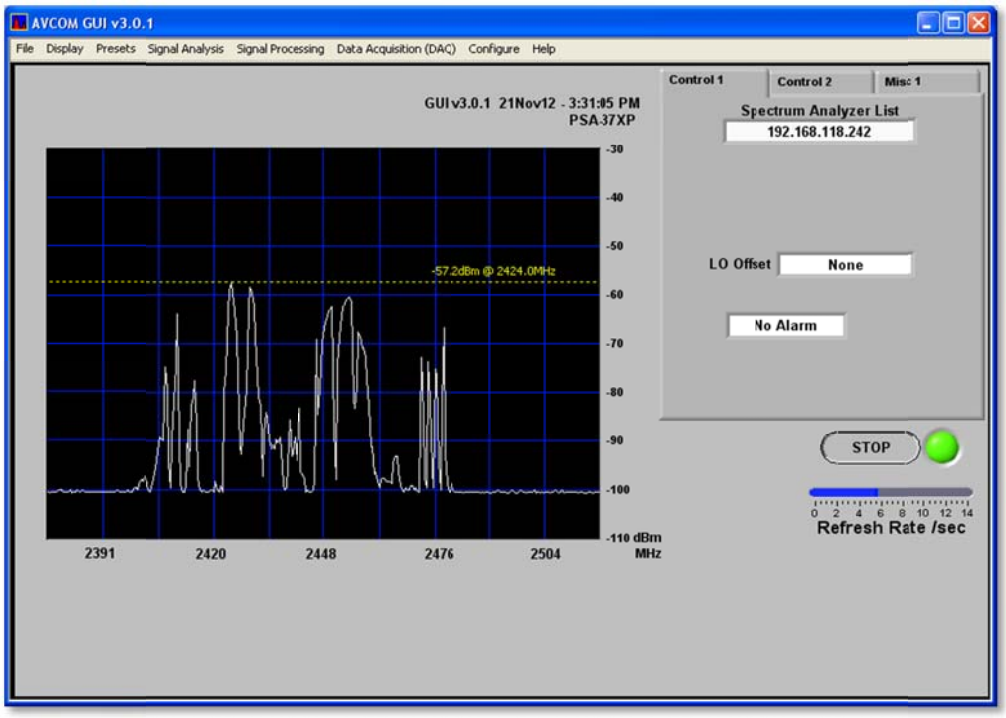
Having recorded the five licensed locations as well as the central office location for VOW, a CN technician drove to each location and performed signal tests for the detection of active wireless frequencies typically utilized to provide WISP service. While en-route between targeted towers, the technician also identified customer premise equipment likely to belong to VOW customers, interviewed select residents, examined Wi-Fi network nomenclatures, and determined other likely tower locations for VOW. The resulting discovery is recorded in **Exhibit D**.

Exhibit D: Validation Points for AP Structures



The CN technician was equipped with an AVCOM PSA-37XP spectrum analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.650 MHz, and 5 GHz frequency bands. Each validation point was scrutinized for frequency of operation. A screen image of the operating frequency (or frequencies) was captured (**Exhibit E**), general notes were recorded for each location – e.g., approximate antenna height, frequency of operation, antenna type (omni-directional or sectored) – and photographs were taken of the access points.

Exhibit E: Signal Test Results for the White Rabbit Tower Location



Results and Submission for April 2013

Of the numerous locations visited during the validation route, 12 access points were identified and relative information was logged into the VOW data file. Additional publicly available data was transferred to the Connected Nation provider information file (**Exhibit F**). A composite propagation study was completed based on the field data **(Exhibit G)**. Both documents were forwarded to VOW, and the provider was advised the information would be submitted to Connected Texas and the NTIA broadband mapping project for processing if there were no discrepancies of the estimated coverage received from the provider within a 48-hour period.

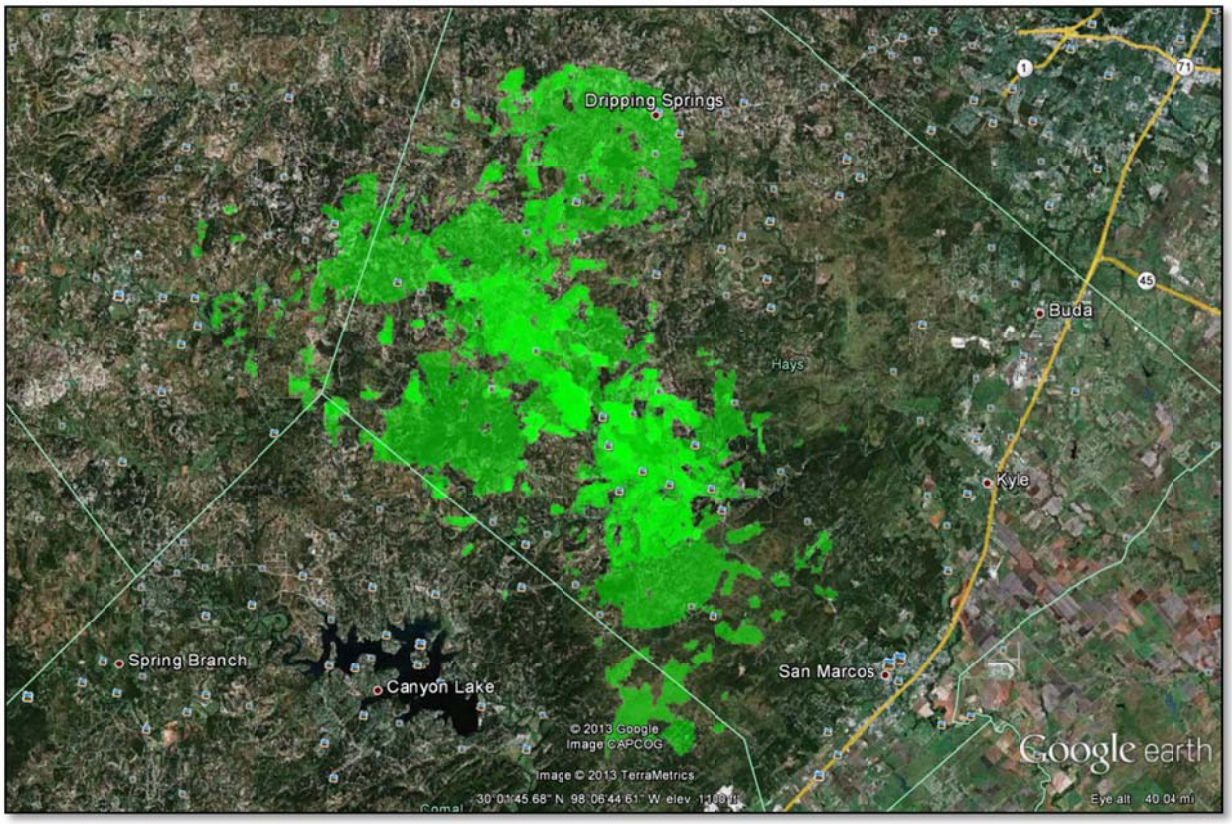
Exhibit F: Field Validation Notes

Wireless Provider Information

Provider Name (Legal entity)	**The Media Cottage, Inc.**
DBA ("Doing Business As") Name	VOWnet
FRN # (10-digit FCC Registration Number)	0018684191

Name of Location	Status	Pop Center	Structure	Latitude	Longitude	Omni?	Radius	Frequency	Gain	Power	Elevation
Office	Active	Wimberley	rooftop	30.00759	-98.11354	Yes	5	2400	10	24	40
Galloway	Active	Big Sky Ranch	rooftop	30.05850	-98.13595	Yes	5	2400	10	24	40
Calhoun	Active	Wimberley	rooftop	30.08506	-98.17036	Yes	5	2400	10	24	40
White Rabbit	Active	Hays/Blanco	tower	30.12272	-98.26414	Yes	5	2400	10	24	60
Hilltop	Active	Wimberley	rooftop	29.96378	-98.07843	No	5	2400	10	24	40
Longhorn	Active	Hays	broadcast tower	29.96378	-98.07843	Yes	5	2400	10	24	100
Mount Sharp	Active	Hays	broadcast tower	30.10600	-98.22120	Yes	5	2400	10	24	100
Tucker	Active	Dripping Spgs	broadcast tower	30.09908	-98.18566	Yes	5	2400	10	24	150
RR12	Active	Wimberley	broadcast tower	29.95473	-98.09404	Yes	5	2400	10	24	180
Paradise	Active	Wimberley	rooftop	29.97996	-98.08793	Yes	5	2400	10	24	40
Rancho Grande	Active	Wimberley	rooftop	30.01558	-98.04946	Yes	5	2400	10	24	40
Wossun	Inactive	Wimberley	tower	30.01879	-98.01552	No	5	2400	10	24	70

Exhibit G: VOW Composite Coverage



WESTEX CONNECT

As part of its ongoing broadband mapping efforts, Connected Nation (CN) has developed a series of processes with the goal of submitting mapping data to NTIA for every known and qualifying last-mile broadband provider, regardless of whether the provider has chosen to support and participate in the State Broadband Initiative mapping program.

The following narrative provides detail regarding the recent data collection activities related to WesTex Connect (WTC) , a wireless Internet service provider (WISP) , located in Abilene, Texas, with a service area spanning across 22 counties in the west Texas area. The narrative will include information regarding how and where CN obtained publicly available data and the on-the-ground due diligence, verification, and validation techniques that support the underlying data.

Background

CN staff members have continued trying to obtain the participation of the provider with 42 instances of communication via telephone and e-mail sessions since September 10, 2009, through February 13, 2013. Only one communication reply was received from the owner of WTC on April 24, 2012, during his attendance at a Connected Texas community engagement meeting in Stamford, TX. Other local attendees included city officials, local residents and 4 area broadband providers (including WTC). The owner of WTC expressed interest in participating with the Connected Texas broadband mapping program; however, he indicated that over the next several months his organization would be extremely busy upgrading the backhaul network and completing tower maintenance. Connected Texas has offered office visits multiple times to assist WesTex Connect staff members with the required data for the SBI program. Most recently, WTC has been evasive to all outreach activity since the April 24, 2012, Stamford meeting.

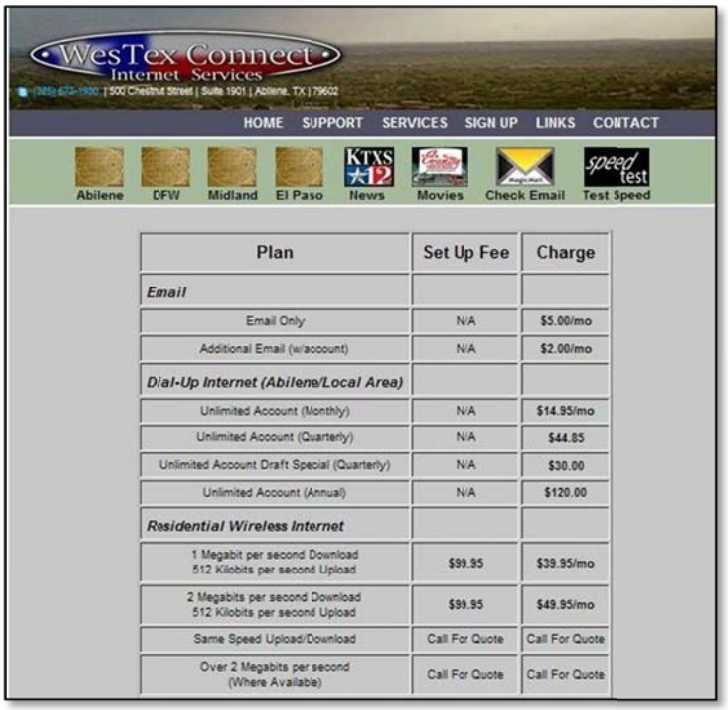
The Issue

WTC, by its lack of responsiveness since September 10, 2009, (combined with lack of follow-up since April 24, 2012), has predicated its unwillingness to participate in the Connected Texas broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN began building a file based on research information and, as time progressed, enriched the file with information obtained through the public domain. For example, CN reviewed the provider's website (www.wtconnect.com) to determine the residential service plans **(Exhibit A)** and the service area **(Exhibit B)** of the provider's wireless network. A search for a Federal Registration Number (FRN) on the FCC **CO**mmission **RE**gistration **S**ystem (CORES) system yielded FRNs of 0017310749 and 0013118849 **(Exhibit C)** with provider contact information. Also, to support field validation of potential transmit sites and/or wireless access points, the FRNs were referenced against the FCC Universal Licensing System (ULS) and Antenna Structure Registrations (ASR) to identify any authorizations, registrations and/or leasing arrangements that the provider may hold. This process yielded licenses an authorization for Station WQMS293, Radio Service: NN 3650-3700MHz with 0 unique locations and Station(s) WQOF824, WQOF825, WQOF826, WQOF827, WQOF828, WQOF830, WQOF831, and WQOF833, Radio Service: MG-Microwave Industrial/Business Pool with 8 unique locations and antenna structure registrations of 12 constructed tower locations **(Exhibit D)**.

Exhibit A: Service Plans



Plan	Set Up Fee	Charge
Email		
Email Only	N/A	$5.00/mo
Additional Email (w/account)	N/A	$2.00/mo
Dial-Up Internet (Abilene/Local Area)		
Unlimited Account (Monthly)	N/A	$14.95/mo
Unlimited Account (Quarterly)	N/A	$44.85
Unlimited Account Draft Special (Quarterly)	N/A	$30.00
Unlimited Account (Annual)	N/A	$120.00
Residential Wireless Internet		
1 Megabit per second Download 512 Kilobits per second Upload	$99.95	$39.95/mo
2 Megabits per second Download 512 Kilobits per second Upload	$99.95	$49.95/mo
Same Speed Upload/Download	Call For Quote	Call For Quote
Over 2 Megabits per second (Where Available)	Call For Quote	Call For Quote

Exhibit B: Service Area

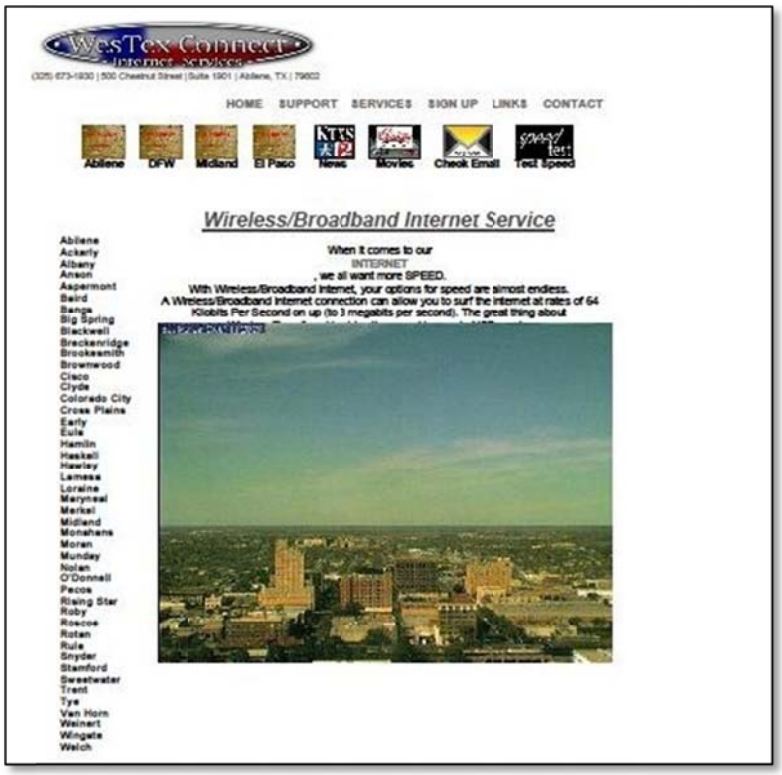


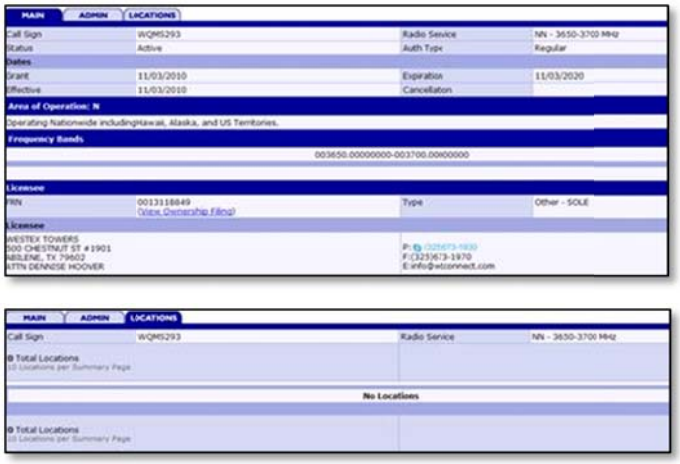
Exhibit C: Federal Registration Numbers

Registration Detail	
FRN:	0017310749
Registration Date:	01/09/2008 02:39:00 PM
Last Updated:	01/09/2008 02:43:00 PM
Business Name:	WESTEX CONNECT
Business Type:	Private Sector , Sole Proprietor
Contact Organization:	
Contact Position:	OWNER
Contact Name:	DENNISE HOOVER
Contact Address:	500 CHESTNUT ST SUITE 1901 ABILENE, TX 79602 United States
Contact Email:	info@wtconnect.com
ContactPhone:	(325) 673-1930
ContactFax:	(325) 673-1970

Registration Detail	
FRN:	0013118849
Registration Date:	03/21/2005 03:56:50 PM
Last Updated:	05/10/2011 01:00:37 PM
Business Name:	WexTex Towers
Business Type:	Private Sector , Sole Proprietor
Contact Organization:	WexTex Towers
Contact Position:	Owner
Contact Name:	Ms Dennise Hoover
Contact Address:	500 Chestnut Suite 1901 Abilene, TX 79602 United States
Contact Email:	hoover@wtconnect.com
ContactPhone:	(325) 673-1930
ContactFax:	

Exhibit D: WesTex Towers' Authorizations and Antenna Structure Registrations Reference

WQMS293



MAIN | ADMIN | LOCATIONS

Call Sign	WQMS293	Radio Service	NN - 3650-3700 MHz
Status	Active	Auth Type	Regular
Dates			
Grant	11/03/2010	Expiration	11/03/2020
Effective	11/03/2010	Cancellation	
Area of Operation: N			
Operating Nationwide including Hawaii, Alaska, and US Territories.			
Frequency Bands			
003650.00000000-003700.00000000			
Licensee			
FRN	0013118849 (View Ownership Filing)	Type	Other - SOLE
Licensee			
WESTEX TOWERS 500 CHESTNUT ST # 1901 ABILENE, TX 79602 ATTN DENNISE HOOVER		P: (325)673-1930 F:(325)673-1970 E:info@wtconnect.com	

MAIN | ADMIN | LOCATIONS

Call Sign	WQMS293	Radio Service	NN - 3650-3700 MHz
0 Total Locations 10 Locations per Summary Page			
No Locations			
0 Total Locations 10 Locations per Summary Page			

MG-Microwave Industrial/Business Pool

Call Sign/Lease ID	Name	FRN	Radio Service	Status	Expiration Date
WQMS293	WESTEX TOWERS	0013118849	NN	Active	11/03/2020
WQOF824	WesTex Towers	0013118849	MG	Active	09/13/2021
WQOF823	WesTex Towers	0013118849	MG	Active	09/13/2021
WQOF826	WesTex Towers	0013118849	MG	Active	09/13/2021
WQOF827	WesTex Towers	0013118849	MG	Active	09/13/2021
WQOF828	WesTex Towers	0013118849	MG	Active	09/13/2021
WQOF830	WesTex Towers	0013118849	MG	Active	09/13/2021
WQOF831	WesTex Towers	0013118849	MG	Active	09/13/2021
WQOF833	WesTex Towers	0013118849	MG	Active	09/13/2021
WQOB624	WESTEX TOWERS	0013118849	YG	Active	01/08/2023

Antenna Structure Registrations

	Registration Number	Status	File Number	Owner Name	Latitude/Longitude	Structure City/State	Overall Height Above Ground (AGL)
1	1048993	Constructed	A0437451	WesTex Towers	32-12-48.0N 102-00-37.0W	TARZAN, TX	70.4
2	1050605	Constructed	A0546661	WesTex Towers	32-44-35.0N 101-43-39.0W	KEY, TX	151.8
3	1050607	Constructed	A0546662	WesTex Towers	32-22-08.8N 100-53-32.8W	COLORADO CITY, TX	97.8
4	1050846	Constructed	A0437449	WesTex Towers	32-13-04.7N 101-27-31.7W	BIG SPRING, TX	48.6
5	1050847	Constructed	A0437456	WexTex Towers	32-16-10.1N 100-48-01.8W	COLORADO CITY, TX	99.1
6	1052397	Constructed	A0548566	WesTex Towers	32-35-48.0N 098-44-27.0W	BRECKENRIDGE, TX	152.4
7	1052417	Constructed	A0613958	WesTex Towers	32-20-42.0N 100-21-16.0W	SWEETWATER, TX	152.1
8	1057585	Constructed	A0546663	WesTex Towers	32-19-43.0N 100-16-35.0W	SWEETWATER, TX	230.1
9	1057644	Constructed	A0437439	WesTex Towers	31-51-43.0N 101-42-02.0W	MEYERS, TX	79.2
10	1057648	Constructed	A0437475	WesTex Towers	32-24-01.0N 099-54-32.0W	ABILENE, TX	48.7
11	1276981	Constructed	A0707448	WesTex Towers	31-50-32.0N 099-04-34.5W	Lake Brownwood, TX	207.2
12	1277756	Granted	A0715119	WesTex Towers	32-17-48.7N 099-33-34.0W	Clyde, TX	97.5
13	1280837	Cancelled	A0746554	WesTex Towers	31-33-19.8N 099-05-43.7W	Brooksmith, TX	96.9
14	1280838	Granted	A0738882	WesTex Tower	32-06-00.5N 100-07-21.1W	Happy Valley, TX	96.9
15	1280839	Granted	A0738884	WesTex Towers	32-22-08.7N 100-53-32.8W	Colorado City, TX	140.5
16	1282041	Constructed	A0746607	WesTex Towers	31-33-19.8N 099-05-43.7W	Brookesmith, TX	94.5
17	1282083	Granted	A0746834	WesTex Towers	32-13-04.9N 101-27-31.9W	Big Springs, TX	84.7
18	1286793	Granted	A0804608	WesTex Towers	32-56-20.0N 099-48-05.6W	Stamford, TX	136.8

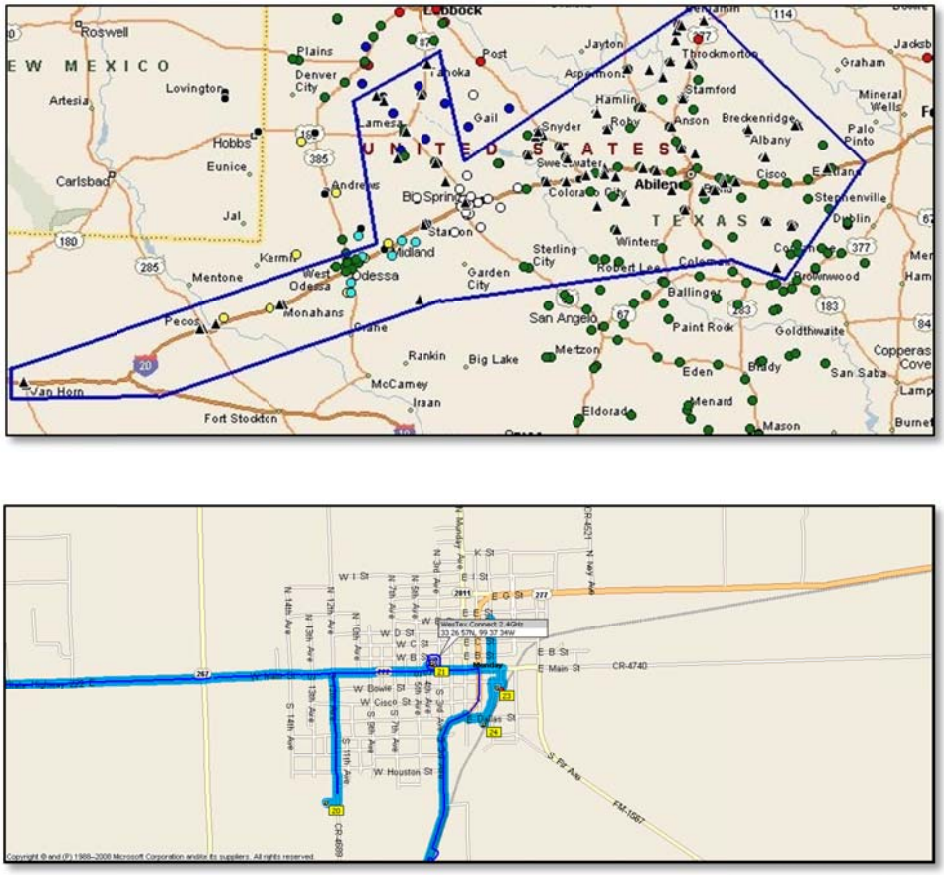
Identification of Provider's Access Point Structures

Connected Nation staff routinely conducts provider validation tests to ensure that provider submitted data (CAD, shapefiles, and hand-drawn polygons) and in-house propagation studies by Connected Nation staff accurately depicts the broadband coverage area of a provider's network. During a scheduled West Texas multiple provider validation trip, the Connected Nation staff

developed points-of -interest locations based on WTC's website service locations as depicted on Exhibit B.

Connected Nation developed a targeted route for the validation trip with an emphasis on the WTC points of interest as a means to help identify transmit structures serving and wireless access points **(Exhibit E)** represented below. Routing of the multiple locations was established by utilizing Microsoft *Streets & Trips*.

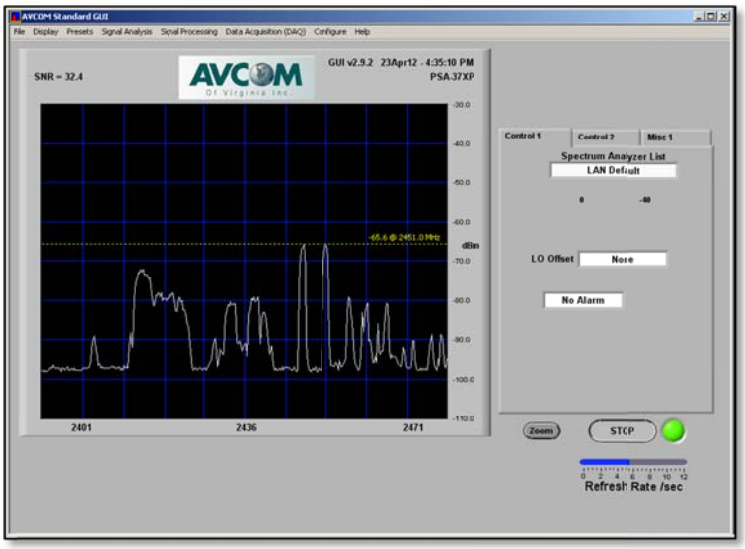
Exhibit E: Providers Validation Targeted Area and WesTex Connect Points of Interest



Testing Techniques

The CN wireless engineer was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands **(Exhibit F)**. Each identified WTC access point was scrutinized for frequency of operation. A screen image of the operating frequency (or frequencies) was captured; general notes were recorded for each location-approximate antenna height, frequency of operation, antenna type (omnidirectional or sectored) and photographs were taken of the access points.

Exhibit F: Field Data for WesTex Connect Munday Access Point Location



Provider	Location	Latitude	Longitude	Frequency Availability	Structure	Approximate Antenna Height	Notes
				2.4GHz			
WesTex Connect	Munday	33.44917	-99.6261	X	Tower	140ft.	Identified during a West Texas provider field validation trip. Omni antenna.

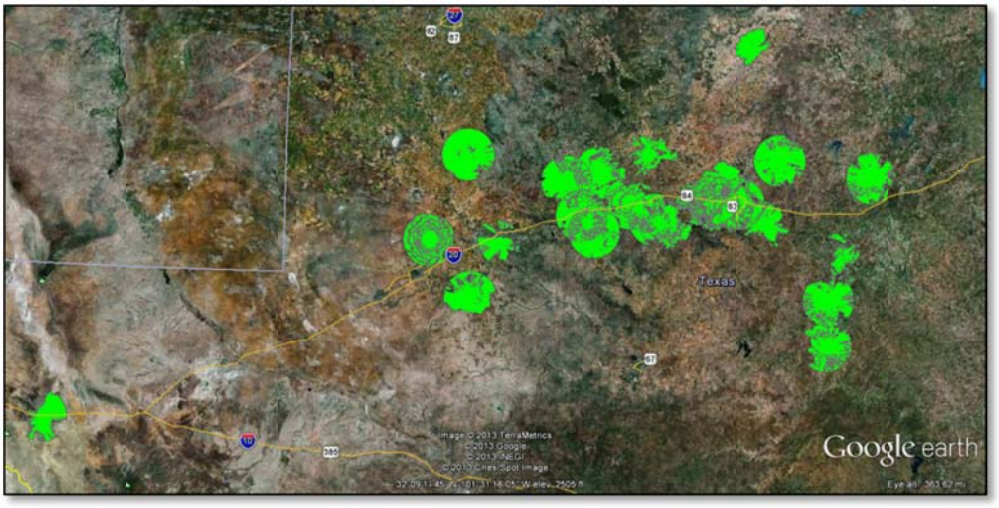
Results and Submission for April 2013

During the WTC validation trip, 10 access point structures were identified and relative information was logged into the WTC field validation notes file **(Exhibit G)**. The field and publicly available data was transferred to the Connected Nation provider information file and a composite propagation study for the estimated coverage area was completed relative to WesTex Connect's licensed microwave and tower registered locations **(Exhibit H)**. Both documents were forwarded to WTC and advised the information will be submitted to Connected Texas and the NTIA broadband mapping project for processing if there are no discrepancies of the estimated coverage received from the provider within a 48-hour period.

Exhibit G: Field Validation Notes

Location	Latitude	Longitude	Frequency		Structure	Approximate Antenna Height	Notes
			900MHz	2.4GHz			
Van Horn	31.03916667	-104.8325	X	X	Tower	100ft.	Identified during a West Texas provider field validation trip. Sector and Omni.
Ira	32.58083333	-101.0022222		X	Tower	190ft.	Identified during a West Texas provider field validation trip. Sector and Omni.
Hermleigh	32.63583333	-100.7605556		X	Water Tower	120ft.	Identified during a West Texas provider field validation trip. Omni.
Roscoe	32.44777778	-100.5322222		X	Grain Silo	130ft.	Identified during a West Texas provider field validation trip. Omni.
Merkel	32.47083333	-100.0094444		X	Water Tower	150ft.	Identified during a West Texas provider field validation trip. Omni.
Trent	32.48944444	-100.1216667		X	Water Tower	120ft.	Identified during a West Texas provider field validation trip. Omni.
Roby	32.74861111	-100.3825		X	Water Tower	120ft.	Identified during a West Texas provider field validation trip. Omni.
Rising Star	32.09472222	-98.98972222		X	Tower	160ft.	Identified during a West Texas provider field validation trip. Sector.
Hawley	32.62166667	-99.8125		X	Tower	160ft.	Identified during a West Texas provider field validation trip. Omni.
Munday	33.44916667	-99.62611111		X	Tower	140ft.	Identified during a West Texas provider field validation trip. Omni.

Exhibit H: WesTex Connect Composite Estimated Coverage



APPENDIX B: BROADBAND PROVIDER LOG

Broadband Provider Log

Complete	289
Non-Responsive/Refused	17
In Progress	3
Reseller Providing Data	0
Count of Datasets by Status	**309**
Total Unique Providers Represented	**201**

Provider Name	Platform	Status	NDA Execution Date	Notes
ADT Systems, Inc.	Fixed Wireless	Data Added to Statewide Inventory		[FEB-28-13 Sarah Finne] Change: New fixed wireless provider found and reported.
Alamo Broadband, Inc.	Fixed Wireless	Data Added to Statewide Inventory		[MAR-01-13 Sarah Finne] Change: Newly identified fixed wireless provider. Coverage derived from TowerCoverage.com.
Alenco Communications, Inc.	DSL	Data Added to Statewide Inventory	11/17/2009	[FEB-28-13 Sarah Finne] Change: Provider reduced coverage in 3 of their exchanges due to FTTH build-out. Also, provider upgraded infrastructure to provide download speeds of tier 7 across all exchanges.
Alenco Communications, Inc.	Fiber	Data Added to Statewide Inventory	11/17/2009	[FEB-27-13 Sarah Finne] Change: Network expansion; provider installed FTTH in two additional full-exchanges (Alexander and Knippa). Also, provider upgraded infrastructure in some areas and can now offer tier 7 download speeds across all FTTH areas.
Anvil Communications	Fixed Wireless	Data Added to Statewide Inventory		[FEB-20-13 Sarah Finne] Correction: Estimated coverage previously submitted for a non-participating provider. This round, Anvil responded and removed a tower from their coverage, stating it wasn't part of their system.
AT&T Communications of Texas, Inc.	DSL	Data Added to Statewide Inventory	12/16/2009	[FEB-22-13 Sarah Finne] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
AT&T Communications of Texas, Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/16/2009	[FEB-21-13 Sarah Finne] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission. Some expansion noted, especially in southern TX, south of Laredo and Corpus Christi.
Big Bend Telephone Company, Inc.	Fixed Wireless	Data Added to Statewide Inventory	3/10/2010	[MAR-01-13 Sarah Finne] Change: Network expansion (provider activated additional towers).
Buford Media Group	Cable	Data Added to Statewide Inventory		[MAR-01-13 Sarah Finne] Correction: Buford Media Group was previously non-responsive, but they provided data this round.
Burcham Solutions, LLC	Fixed Wireless	Data Added to Statewide Inventory	8/2/2012	[FEB-25-13 Sarah Finne] Change: Network expansion; provider added an additional tower site.
Cable ONE Inc.	Cable	Data Added to Statewide Inventory	12/7/2009	[FEB-21-13 Sarah Finne] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission. Provider also upgraded to all DOCSIS 3.0, with tier 9 download and tier 4 upload speeds.
CenturyLink	DSL	Data Added to Statewide Inventory	12/4/2009	[FEB-21-13 Sarah Finne] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Charter Communications, Inc.	Cable	Data Added to Statewide Inventory	12/15/2009	[FEB-21-13 Sarah Finne] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Clearwire Corporation	Mobile Wireless	Data Added to Statewide Inventory	3/3/2010	[FEB-20-13 Sarah Finne] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Cobridge Communications, LLC	Cable	Data Added to Statewide Inventory		[FEB-22-13 Sarah Finne] Change and Correction: Added new markets of Atlanta and Carthage, TX. Corrected existing markets to show actual service area rather than just municipal boundaries: Hallsville, Jefferson, and Marshall, TX.
Comcast Cable Communications, LLC	Cable	Data Added to Statewide Inventory	12/7/2009	[FEB-25-13 Sarah Finne] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Consolidated Communications	DSL	Data Added to Statewide Inventory	11/30/2009	[FEB-20-13 Sarah Finne] Change: Provider removed a bit of coverage from their CCTX (Lufkin exchange) between Burke and Huntington, TX and also added a tiny bit of coverage around Diboll, TX.

Consolidated Communications	Fiber	Data Added to Statewide Inventory	11/30/2009	[FEB-20-13 Sarah Finne] Change: Provider added additional FTTH in all 3 of their exchanges (Conroe, Lufkin, and Katy); both CCTX and CCFB.
CTX Unwired	Fixed Wireless	Data Added to Statewide Inventory	2/14/2011	[FEB-22-13 Sarah Finne] Change: Network expansion; provider added 5 new towers (Cotulla, Hindes, Kingsville, Pleasanton, and Smithville, TX).
Cumby Telephone Cooperative, Inc.	DSL	Data Added to Statewide Inventory	3/5/2010	[FEB-20-13 Sarah Finne] Change: Network expansion (provider added a small area of coverage West of Cumby, TX), and infrastructure upgrades providing tier 7 download and tier 3 upload capabilities.
Cumby Telephone Cooperative, Inc.	Fiber	Data Added to Statewide Inventory	3/5/2010	[FEB-20-13 Sarah Finne] Change: Network expansion and infrastructure upgrades providing tier 7 download and tier 3 upload capabilities.
Dell Telephone Cooperative, Inc.	Fixed Wireless	Data Added to Statewide Inventory	4/6/2010	[FEB-20-13 Sarah Finne] Change: Provider added additional towers and existing tower propagations were recreated utilizing more accurate settings/data.
Eastex Telephone Cooperative, Inc.	DSL	Data Added to Statewide Inventory	6/20/2011	[FEB-27-13 Sarah Finne] Change: Network expansion (provider installed additional remote terminals to extend DSL services).
GHz Wireless	Fixed Wireless	Data Added to Statewide Inventory		[MAR-01-13 Sarah Finne] Change: Newly identified fixed wireless provider. Coverage downloaded from TowerCoverage.com.
Guadalupe Valley Communications Systems	DSL	Data Added to Statewide Inventory	11/23/2009	[FEB-25-13 Sarah Finne] Change: Network expansion; provider added additional DSL areas within their exchange.
Guadalupe Valley Communications Systems	Fiber	Data Added to Statewide Inventory	11/23/2009	[FEB-25-13 Sarah Finne] Change: Network expansion (provider added additional FTTH in both their ILEC and CLEC areas).
GVEC.net	Fixed Wireless	Data Added to Statewide Inventory	2/25/2010	[MAR-01-13 Sarah Finne] Change: Network expansion (provider installed two additional tower sites).
Hillcountry Networks	Fixed Wireless	Data Added to Statewide Inventory		[FEB-20-13 Sarah Finne] Correction: Provider previously refused to participate. However, we received data and are submitting coverage for their 9 towers for the first time.
Internet America, Inc.	Fixed Wireless	Data Added to Statewide Inventory	2/15/2013	[FEB-28-13 Sarah Finne] Correction: Internet America, Inc. was previously non-responsive, but they provided data this round.
Leap Wireless International, Inc.	Mobile Wireless	Data Added to Statewide Inventory	4/6/2010	[FEB-22-13 Sarah Finne] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
MegaPath Corporation	DSL	Data Added to Statewide Inventory	2/15/2010	[FEB-26-13 Sarah Finne] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Mid-Plains Rural Telephone Cooperative, Inc.	DSL	Data Added to Statewide Inventory	3/5/2010	[FEB-28-13 Sarah Finne] Change: Provider converted several copper areas to FTTH, therefore they decreased their DSL coverage area (but, expanded their FTTH coverage).
Mid-Plains Rural Telephone Cooperative, Inc.	Fiber	Data Added to Statewide Inventory	3/5/2010	[FEB-28-13 Sarah Finne] Change: Network expansion. Provider converted several copper/DSL areas over to FTTH.
NDemand, Inc.	Fixed Wireless	Data Added to Statewide Inventory		[FEB-28-13 Sarah Finne] Change and Correction: Propagations were recreated to account for 3650-3700 MHz spectrum, and to more-accurately portray their coverage area. Also, provider installed additional towers.
New Source Broadband II	Fixed Wireless	Data Added to Statewide Inventory		[FEB-26-13 Sarah Finne] Correction: New Source Broadband was previously non-responsive, but they provided data this round.
Nortex Communications	Fixed Wireless	Data Added to Statewide Inventory	2/12/2010	[FEB-28-13 Sarah Finne] Change and Correction: All propagations recreated to accurately reflect 700 MHz spectrum. Also provider installed some additional towers (increasing network coverage).
North Texas Cellular, Inc.	DSL	Data Added to Statewide Inventory	3/22/2010	[FEB-20-13 Sarah Finne] Change: Network expansion (provider added 4 remote terminals) and infrastructure upgrade to allow tier 4 upload speeds.
Northland Communications	Cable	Data Added to Statewide Inventory	8/19/2010	[FEB-28-13 Sarah Finne] Change: Network expansion; provider added additional serviceable areas, including a new market (Dublin, TX). Also, provider upgraded infrastructure in some areas previously reported as tier 6. Some of those areas can now receive tier 7 download speeds.
Panhandle Telephone Cooperative, Inc.	Fixed Wireless	Data Added to Statewide Inventory	12/7/2009	[FEB-28-13 Sarah Finne] Change: Network expansion; provider installed new towers on the OK/TX border.
Phoenix Broadband, LLC	Fixed Wireless	Data Added to Statewide Inventory		[MAR-01-13 Sarah Finne] Correction: Phoenix Broadband was previously non-responsive, but they provided data this round.
Poka Lambro Telephone Cooperative, Inc.	DSL	Data Added to Statewide Inventory	2/15/2010	[FEB-20-13 Sarah Finne] Change: Provider added an additional Remote Terminal to ADSL ILEC area near Los Ybanez, TX (expanded service area slightly).

Poka Lambro Telephone Cooperative, Inc.	Fiber	Data Added to Statewide Inventory	2/15/2010	[FEB-20-13 Sarah Finne] Change: Provider expanded FTTH service area in Lynn County (New Home, TX), and added some service in Borden County as well.
RB3, LLC	Cable	Data Added to Statewide Inventory	10/23/2009	[FEB-27-13 Sarah Finne] Change: Network expansion; provider added cable broadband services in Gorman, TX. Also, provider upgraded infrastructure in some existing markets to allow for tier 5 download speeds.
RB3, LLC	Fixed Wireless	Data Added to Statewide Inventory	10/23/2009	[FEB-27-13 Sarah Finne] Change: Provider decommissioned the Hale Center tower site (therefore, reduction in coverage).
rNetworks, LLC	Fixed Wireless	Data Added to Statewide Inventory	12/13/2012	[FEB-26-13 Sarah Finne] Correction: Initial submission of provider's coverage, but they were in service previously.
Rock Solid Internet & Telephone	Fixed Wireless	Data Added to Statewide Inventory	2/14/2011	[FEB-25-13 Sarah Finne] Change: Provider acquired tower assets from Maverick Internet (d/b/a Texxa Internet Services) and upgraded those towers to tier 7 download and tier 5 upload speeds.
RodZoo Wireless	Fixed Wireless	Data Added to Statewide Inventory		[FEB-28-13 Sarah Finne] Change: Network expansion (provider installed an additional fixed wireless tower).
Santa Rosa Telephone Cooperative, Inc.	DSL	Data Added to Statewide Inventory	3/9/2010	[FEB-27-13 Sarah Finne] Change: Network expansion; provider converted copper to fiber in their Thalia exchange (therefore, removing DSL coverage).
Santa Rosa Telephone Cooperative, Inc.	Fiber	Data Added to Statewide Inventory	3/9/2010	[FEB-27-13 Sarah Finne] Change: Provider converted some copper to fiber in their Thalia exchange (therefore, increasing their FTTH coverage area). Also, provider upgraded infrastructure and can now offer tier 7 download and tier 3 upload speeds.
Skycasters	Satellite	Data Added to Statewide Inventory	10/16/2012	[NOV-26-12 Sarah Finne] Correction: Initial submission of newly-found satellite provider (however, they were previously in service).
SOS Communications LLC	Fixed Wireless	Data Added to Statewide Inventory		[MAR-01-13 Sarah Finne] Change and Correction: Propagations recreated to refine coverage area, and new towers were added.
South Plains Telephone Cooperative, Inc.	Fiber	Data Added to Statewide Inventory	3/15/2010	[FEB-25-13 Sarah Finne] Change: Network expansion; provider installed additional FTTH.
Sprint Nextel Corporation	Mobile Wireless	Data Added to Statewide Inventory	1/14/2010	[FEB-20-13 Sarah Finne] Change: Provider added tier 6 BPCS coverage around Dallas, TX.
T-Mobile USA, Inc.	Mobile Wireless	Data Added to Statewide Inventory	1/8/2010	[FEB-21-13 Sarah Finne] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission. Some UMTS expansion around Lubbock and Amarillo, TX.
Texas Communications	Fixed Wireless	Data Added to Statewide Inventory		[MAR-01-13 Sarah Finne] Correction: Texas Communications was previously non-responsive, but they provided data this round.
Texas Wireless Internet	Fixed Wireless	Data Added to Statewide Inventory	5/14/2010	[MAR-01-13 Sarah Finne] Change: Network expansion (provider installed two new tower sites).
Time Warner Cable Inc.	Cable	Data Added to Statewide Inventory	12/21/2009	[FEB-22-13 Sarah Finne] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission. Also, provider name has changed to Time Warner Cable Inc. and FRN# to 0007556251.
TISD, Inc.	Fixed Wireless	Data Added to Statewide Inventory	4/19/2010	[FEB-28-13 Sarah Finne] Change: Provider installed two additional towers (but, it didn't add to coverage area. Slight decrease in coverage due to recreation of a few tower propagations.
TransWorld Network Corporation	Fixed Wireless	Data Added to Statewide Inventory	12/29/2012	[MAR-01-13 Sarah Finne] Change: New fixed wireless provider identified; first time participant.
Verizon Southwest, Inc.	DSL	Data Added to Statewide Inventory	12/14/2009	[FEB-26-13 Sarah Finne] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Verizon Southwest, Inc.	Fiber	Data Added to Statewide Inventory	12/14/2009	[FEB-26-13 Sarah Finne] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission.
Verizon Southwest, Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/14/2009	[FEB-21-13 Sarah Finne] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2013 submission. Some expansion in west central TX, southwest of San Angelo.
WEHCo Video, Inc.	Cable	Data Added to Statewide Inventory		[FEB-20-13 Sarah Finne] Change: Provider upgraded infrastructure and can now offer tier 9 download speeds (previously tier 7), and tier 8 typical speeds (previously tier 7). Also, a small area of coverage was added in Hallsville, TX.
Wes-Tex Telecommunications, Ltd.	Fiber	Data Added to Statewide Inventory	3/1/2010	[FEB-20-13 Sarah Finne] Change: Provider now offers FTTH in Stanton, St. Lawrence, Lomax,and Garden City (new platform).

West Texas Rural Telephone Cooperative, Inc.	Fiber	Data Added to Statewide Inventory	3/31/2010	[MAR-05-13 Sarah Finne] Change: Provider subsidiary West Texas Rural Telephone added FTTH in two small areas east and west of Hereford, TX. Also, provider subsidiary WT Services, Inc. upgraded infrastructure in Hereford, TX and can now offer tier 7 upload speeds.
West Texas Rural Telephone Cooperative, Inc.	DSL	Data Added to Statewide Inventory	3/31/2010	[MAR-01-13 Sarah Finne] Change: Additional provider subsidiary (West Texas Rural Telephone) performed infrastructure upgrades and now qualify as broadband with tier 6 downlaod speeds near their COs and tier 4 download speeds near their RTs. Also, added several network extending devices throughout their exchange (therefore, significant network expansion for this provider).
XIT Telecommunications & Technology, Ltd.	Fiber	Data Added to Statewide Inventory	3/2/2010	[FEB-21-13 Sarah Finne] Change: Network expansion (added coverage around and south of Texline and near Dalhart and Stratford). Also, provider upgraded infrastructure and can now offer tier 7 download and tier 4 upload speeds.
XIT Telecommunications & Technology, Ltd.	DSL	Data Added to Statewide Inventory	3/2/2010	[FEB-21-13 Sarah Finne] Change: Provider upgraded infrastructure and can now offer tier 7 download and tier 4 upload speeds. Also, new service added in Vega, TX.
Zito Midwest, LLC	Cable	Data Added to Statewide Inventory	2/17/2011	[MAR-06-13 Sarah Finne] Change: Zito purchased Windjammer's cable operations, thereby adding the Elkhart, Graham, and Palestine systems to their service territory.
Alenco Communications, Inc.	Backhaul	Backhaul Provider Only Processing	11/17/2009	
Conterra Ultra Broadband, LLC	Backhaul	Backhaul Provider Only Processing		
Level 3 Communications, LLC	Backhaul	Backhaul Provider Only Processing	12/14/2009	
MegaPath Corporation	Backhaul	Backhaul Provider Only Processing	2/15/2010	
Rock Solid Internet & Telephone	Backhaul	Backhaul Provider Only Processing	2/14/2011	
Sprint Nextel Corporation	Backhaul	Backhaul Provider Only Processing	1/14/2010	
T-Mobile USA, Inc.	Backhaul	Backhaul Provider Only Processing	1/8/2010	
Verizon Southwest, Inc.	Backhaul	Backhaul Provider Only Processing	12/14/2009	
Dell Telephone Cooperative, Inc.	DSL	Speed Only Update; Data Processing Complete	4/6/2010	[FEB-20-13 Sarah Finne] Change: Provider upgraded infrastructure and can now offer tier 5 download speeds.
Digitex.com	Fixed Wireless	Speed Only Update; Data Processing Complete	5/25/2010	[MAR-15-13 Sarah Finne] Change: Provider upgraded infrastructure and can now offer tier 6 download speeds in select areas.
Hughes Network Systems, LLC	Satellite	Speed Only Update; Data Processing Complete	2/5/2010	[MAR-05-13 Sarah Finne] Change: Provider upgraded infrastructure and can now offer tier 7 download and tier 4 upload speeds.
Tatum Telephone Company	DSL	Speed Only Update; Data Processing Complete	11/24/2009	[FEB-20-13 Sarah Finne] Change: Provider upgraded infrastructure and can now offer tier 5 download and tier 3 upload speeds.
AMA TechTel	Fixed Wireless	No Update-Estimated Coverage Submitted for Non-Participating Provider		
Broadwaves	Fixed Wireless	No Update-Estimated Coverage Submitted for Non-Participating Provider		
East Texas Broadband	Fixed Wireless	No Update-Estimated Coverage Submitted for Non-Participating Provider		
East Texas Cable	Cable	No Update-Estimated Coverage Submitted for Non-Participating Provider		
Skynet Communications	Fixed Wireless	No Update-Estimated Coverage Submitted for Non-Participating Provider		
Starnet Online Systems	Fixed Wireless	No Update-Estimated Coverage Submitted for Non-Participating Provider		
Telecom Cable, LLC	Cable	No Update-Estimated Coverage Submitted for Non-Participating Provider		
TheSPECnet, Inc.	Fixed Wireless	No Update-Estimated Coverage Submitted for Non-Participating Provider		
VRFuturenet	Fixed Wireless	No Update-Estimated Coverage Submitted for Non-Participating Provider		
CKS Management, Inc.	Fixed Wireless	Updated-Estimated Coverage Submitted for Non-Participating Provider		[MAR-04-13 Sarah Finne] Change: Updated-Estimated Coverage Submitted for Non-Participating Provider. New towers in service.
GoZoe Wireless, LLP	Fixed Wireless	Updated-Estimated Coverage Submitted for Non-Participating Provider		[MAR-04-13 Sarah Finne] Change: Updated-Estimated Coverage Submitted for Non-Participating Provider. New towers in service.
Zulu Internet, Inc.	Fixed Wireless	Updated-Estimated Coverage Submitted for Non-Participating Provider		[MAR-04-13 Sarah Finne] Change: Updated-Estimated Coverage Submitted for Non-Participating Provider. New towers in service.
Gecko Inter.Net, Inc.	Fixed Wireless	Estimated Coverage Submitted for Non-Participating Provider		[FEB-20-12 Sarah Finne] Correction: Estimated coverage created and submitted for non-participating provider.
Indian Creek Internet Services, Inc.	Fixed Wireless	Estimated Coverage Submitted for Non-Participating Provider		[FEB-20-12 Sarah Finne] Correction: Estimated coverage created and submitted for non-participating provider.
Terral Telephone Company	Fixed Wireless	Estimated Coverage Submitted for Non-Participating Provider		[FEB-20-12 Sarah Finne] Correction: Estimated coverage created and submitted for non-participating provider.
The Media Cottage, Inc.	Fixed Wireless	Estimated Coverage Submitted for Non-Participating Provider		[FEB-20-12 Sarah Finne] Correction: Estimated coverage created and submitted for non-participating provider.
WesTex Connect	Fixed Wireless	Estimated Coverage Submitted for Non-Participating Provider		[FEB-20-12 Sarah Finne] Correction: Estimated coverage created and submitted for non-participating provider.

Windstream Communications	DSL	Approval for Update Not Received – Data Still Submitted	1/19/2010	[FEB-26-13 Sarah Finne] Change and Correction: Provider submitted additional census blocks as serviceable area, and corrected some known speed issues with existing data.
Airband Communications, Inc.	Backhaul	No Update to Provide	3/29/2010	
Aledo Broadband	Backhaul	No Update to Provide	3/26/2010	
Aledo Broadband	Fixed Wireless	No Update to Provide	3/26/2010	
Alenco Communications, Inc.	Fixed Wireless	No Update to Provide	11/17/2009	
Allegiance Communications	Cable	No Update to Provide	2/4/2010	
Alpheus Communications, L.P.	Backhaul	No Update to Provide		
Argon Technologies	Fixed Wireless	No Update to Provide		
AT&T Communications of Texas, Inc.	Backhaul	No Update to Provide	12/16/2009	
AwesomeNet, Inc.	Fixed Wireless	No Update to Provide		
Baja Broadband Holding Company	Cable	No Update to Provide		
Basin 2 Way Radio, Inc.	Fixed Wireless	No Update to Provide	4/14/2010	
Basin Broadband, Inc.	Fixed Wireless	No Update to Provide	3/23/2010	
Bee Creek Communications	Fixed Wireless	No Update to Provide	5/21/2010	
Big Bend Telephone Company, Inc.	Backhaul	No Update to Provide	3/10/2010	
Big Bend Telephone Company, Inc.	DSL	No Update to Provide	3/10/2010	
Big Bend Telephone Company, Inc.	Fiber	No Update to Provide	3/10/2010	
Big Bend Telephone Company, Inc.	Satellite	No Update to Provide	3/10/2010	
Blossom Telephone Company, Inc.	DSL	No Update to Provide	3/26/2010	
Border to Border Communications, Inc.	DSL	No Update to Provide	2/20/2012	
Border to Border Communications, Inc.	Fiber	No Update to Provide	2/20/2012	
Border to Border Communications, Inc.	Fixed Wireless	No Update to Provide	2/20/2012	
Brazoria Telephone Company	Cable	No Update to Provide	6/17/2010	
Brazoria Telephone Company	DSL	No Update to Provide	6/17/2010	
Broadband Data Services of Texas, LLC	Fixed Wireless	No Update to Provide	4/29/2010	
Broadcomm.US	Fixed Wireless	No Update to Provide	3/9/2011	
Buffalo Cable Television	Cable	No Update to Provide		
Burcham Solutions, LLC	Backhaul	No Update to Provide	8/2/2012	
Cameron Telephone Company, LLC	Backhaul	No Update to Provide	3/18/2010	
Cameron Telephone Company, LLC	DSL	No Update to Provide	3/18/2010	
Cap Rock Telephone Cooperative, Inc.	Backhaul	No Update to Provide	3/4/2010	
Cap Rock Telephone Cooperative, Inc.	DSL	No Update to Provide	3/4/2010	
Cap Rock Telephone Cooperative, Inc.	Fiber	No Update to Provide	3/4/2010	
Cap Rock Telephone Cooperative, Inc.	Fixed Wireless	No Update to Provide	3/4/2010	
Celltex Networks, LLC	Fixed Wireless	No Update to Provide		
Central Texas Cable Partners, Inc.	Cable	No Update to Provide	2/22/2010	
Central Texas Telephone Cooperative, Inc.	DSL	No Update to Provide	3/2/2010	
Central Texas Telephone Cooperative, Inc.	Fixed Wireless	No Update to Provide	3/2/2010	
Central Texas Telephone Investments, LP	Fixed Wireless	No Update to Provide	4/22/2010	
CenturyLink	Backhaul	No Update to Provide	12/4/2009	
CenturyLink	Backhaul	No Update to Provide	12/4/2009	
Cequel Communications	Backhaul	No Update to Provide	12/15/2009	
Cequel Communications	Cable	No Update to Provide	12/15/2009	
Charter Communications, Inc.	Backhaul	No Update to Provide	12/15/2009	
Clearwire Corporation	Fixed Wireless	No Update to Provide	3/3/2010	
Coleman County Telephone Cooperative, Inc.	DSL	No Update to Provide	3/10/2010	
Coleman County Telephone Cooperative, Inc.	Fixed Wireless	No Update to Provide	3/10/2010	
Colorado Valley Telephone Cooperative, Inc.	DSL	No Update to Provide	3/9/2010	
Colorado Valley Telephone Cooperative, Inc.	Fixed Wireless	No Update to Provide	3/9/2010	
Community Telephone Company, Inc.	Backhaul	No Update to Provide	3/10/2010	
Community Telephone Company, Inc.	DSL	No Update to Provide	3/10/2010	
Connextions Telcom	DSL	No Update to Provide	3/2/2011	
Connextions Telcom	Fiber	No Update to Provide	3/2/2011	
Dell Telephone Cooperative, Inc.	Backhaul	No Update to Provide	4/6/2010	
Dell Telephone Cooperative, Inc.	Fiber	No Update to Provide	4/6/2010	
DigiComm Enterprises, LLC	Fixed Wireless	No Update to Provide	6/15/2010	
Digital Passage, Inc.	Fixed Wireless	No Update to Provide		
East Texas WiFi	Fixed Wireless	No Update to Provide		
Eastland Internet Inc	Fixed Wireless	No Update to Provide		
Electra Telephone Company	DSL	No Update to Provide	11/24/2009	
ENMR Telephone Cooperative, Inc.	Backhaul	No Update to Provide	4/22/2010	
ENMR Telephone Cooperative, Inc.	DSL	No Update to Provide	4/22/2010	
ENMR Telephone Cooperative, Inc.	Fiber	No Update to Provide	4/22/2010	
ERF Wireless	Fixed Wireless	No Update to Provide		
ETAN Industries	Cable	No Update to Provide		
ETEX Communications, LP	Backhaul	No Update to Provide	2/25/2010	
ETEX Communications, LP	DSL	No Update to Provide	2/25/2010	
ETEX Communications, LP	Fiber	No Update to Provide	2/25/2010	
ETS Cablevision Co., Inc.	Cable	No Update to Provide	10/30/2009	
ETS Cablevision Co., Inc.	Fiber	No Update to Provide	10/30/2009	
Farm to Market Broadband LP	Fixed Wireless	No Update to Provide	4/16/2010	
Five Area Telephone Cooperative, Inc.	DSL	No Update to Provide	3/8/2010	
Five Area Telephone Cooperative, Inc.	Fiber	No Update to Provide	3/8/2010	
Ganado Telephone Company, Inc.	DSL	No Update to Provide	11/16/2009	
GEUS	Cable	No Update to Provide		
Gower Computer Support, Inc.	Fixed Wireless	No Update to Provide	2/14/2011	
Grande Communications Networks LLC	Cable	No Update to Provide	3/31/2010	
Grayson CableRocket, LLC	Cable	No Update to Provide	6/15/2010	
Guadalupe Valley Communications Systems	Cable	No Update to Provide	11/23/2009	
GVEC.net	Backhaul	No Update to Provide	2/25/2010	
Helmsco, Inc.	Fixed Wireless	No Update to Provide	2/15/2010	
Hill Country Telephone Cooperative, Inc.	Backhaul	No Update to Provide	3/9/2011	
Hill Country Telephone Cooperative, Inc.	DSL	No Update to Provide	3/9/2011	
Hill Country Telephone Cooperative, Inc.	Fixed Wireless	No Update to Provide	3/9/2011	
Hometown Computing	Fixed Wireless	No Update to Provide		
IGN-LPG Enterprises LLC	Fixed Wireless	No Update to Provide	2/17/2011	
Industry Telephone Company	DSL	No Update to Provide	11/6/2009	
JAB Wireless, Inc.	Fixed Wireless	No Update to Provide	6/14/2010	

James Cable LLC	Cable	No Update to Provide	1/11/2010	[FEB-25-13 Sarah Finne] Change: Provider d/b/a name has changed from CommuniComm Services to Mediastream.
James Cable LLC	Fixed Wireless	No Update to Provide	1/11/2010	[FEB-25-13 Sarah Finne] Change: Provider d/b/a name has changed from CommuniComm Services to Mediastream.
La Ward Telephone Exchange, Inc.	DSL	No Update to Provide	11/16/2009	
Lake Livingston Telephone Company, Inc.	DSL	No Update to Provide	11/20/2009	
Livingston Telephone Company, Inc.	Backhaul	No Update to Provide	2/25/2010	
Livingston Telephone Company, Inc.	DSL	No Update to Provide	2/25/2010	
LVWifi.com	Fixed Wireless	No Update to Provide		
McDonald Group	Cable	No Update to Provide	3/5/2010	
MetroPCS Wireless, Inc.	Mobile Wireless	No Update to Provide	2/10/2012	
Mexus Communications	Fixed Wireless	No Update to Provide		
Mid-Plains Rural Telephone Cooperative, Inc.	Backhaul	No Update to Provide	3/5/2010	
Millennium Telcom, LLC	Cable	No Update to Provide	8/26/2010	
Millennium Telcom, LLC	DSL	No Update to Provide	8/26/2010	
Millennium Telcom, LLC	Fiber	No Update to Provide	8/26/2010	
Millennium Telcom, LLC	Fixed Wireless	No Update to Provide	8/26/2010	
NetWest Online, Inc.	Fixed Wireless	No Update to Provide	2/23/2010	
Neu Ventures, Inc.	Backhaul	No Update to Provide	6/17/2010	
Neu Ventures, Inc.	Cable	No Update to Provide	6/17/2010	
Neu Ventures, Inc.	Fixed Wireless	No Update to Provide	6/17/2010	
Nextlink Wireless, Inc.	Backhaul	No Update to Provide	2/12/2010	
Nortex Communications	Backhaul	No Update to Provide	2/12/2010	
Nortex Communications	Cable	No Update to Provide	2/12/2010	
Nortex Communications	DSL	No Update to Provide	2/12/2010	
Nortex Communications	Fiber	No Update to Provide	2/12/2010	
North Texas Telephone Company	DSL	No Update to Provide	11/30/2009	
Our-Town Internet Services, LLC	Fixed Wireless	No Update to Provide	3/31/2010	
Panhandle Telephone Cooperative, Inc.	Backhaul	No Update to Provide	12/7/2009	
Panhandle Telephone Cooperative, Inc.	Cable	No Update to Provide	12/7/2009	
Panhandle Telephone Cooperative, Inc.	DSL	No Update to Provide	12/7/2009	
Panhandle Telephone Cooperative, Inc.	Fiber	No Update to Provide	12/7/2009	
Panhandle Telephone Cooperative, Inc.	Mobile Wireless	No Update to Provide	12/7/2009	
Pathwayz Communications, Inc.	DSL	No Update to Provide	12/9/2011	
Pathwayz Communications, Inc.	Fixed Wireless	No Update to Provide	12/9/2011	
Peoples Communication, Inc.	Backhaul	No Update to Provide	3/4/2010	
Peoples Communication, Inc.	DSL	No Update to Provide	3/4/2010	
Peoples Communication, Inc.	Fixed Wireless	No Update to Provide	3/4/2010	
Poka Lambro Telephone Cooperative, Inc.	Backhaul	No Update to Provide	2/15/2010	
Poka Lambro Telephone Cooperative, Inc.	Fixed Wireless	No Update to Provide	2/15/2010	
Promptwireless, LLP	Fixed Wireless	No Update to Provide	4/27/2010	
Pulsestream Internet Services, LLC	Backhaul	No Update to Provide	6/2/2011	
Ridgewood Cable	Fixed Wireless	No Update to Provide		
Rioplex Wireless LTD	Fixed Wireless	No Update to Provide	3/3/2010	
Riviera Telephone Company, Inc.	Backhaul	No Update to Provide	3/11/2010	
Riviera Telephone Company, Inc.	DSL	No Update to Provide	3/11/2010	
Santa Rosa Telephone Cooperative, Inc.	Backhaul	No Update to Provide	3/9/2010	
Santa Rosa Telephone Cooperative, Inc.	Fixed Wireless	No Update to Provide	3/9/2010	
Skynet Country, LLC	Fixed Wireless	No Update to Provide		
South Plains Telephone Cooperative, Inc.	Backhaul	No Update to Provide	3/15/2010	
South Plains Telephone Cooperative, Inc.	DSL	No Update to Provide	3/15/2010	
Southwest Arkansas Telephone Cooperative, Inc.	Backhaul	No Update to Provide	1/19/2010	
Southwest Arkansas Telephone Cooperative, Inc.	DSL	No Update to Provide	1/19/2010	
Southwest Texas Telephone Company	Backhaul	No Update to Provide	3/3/2010	
Southwest Texas Telephone Company	DSL	No Update to Provide	3/3/2010	
Southwest Texas Telephone Company	Fiber	No Update to Provide	3/3/2010	
Southwest Texas Telephone Company	Fixed Wireless	No Update to Provide	3/3/2010	
Spacenet, Inc.	Satellite	No Update to Provide		
Speed of Light Broadband, Inc.	Fixed Wireless	No Update to Provide	11/3/2009	
Stelera Wireless, LLC	Mobile Wireless	No Update to Provide		
Taylor Telephone Cooperative, Inc.	Backhaul	No Update to Provide	3/11/2010	
Taylor Telephone Cooperative, Inc.	DSL	No Update to Provide	3/11/2010	
Taylor Telephone Cooperative, Inc.	Fiber	No Update to Provide	3/11/2010	
Texas CellNet, Inc.	Fixed Wireless	No Update to Provide	2/17/2011	
Texhoma Wireless, L.L.C.	Fixed Wireless	No Update to Provide	3/8/2011	
TGN Cable	Cable	No Update to Provide	5/20/2010	
Time Warner Cable Inc.	Backhaul	No Update to Provide	12/21/2009	
Totelcom Communications, LLC	DSL	No Update to Provide	11/30/2009	
Totelcom Communications, LLC	Fixed Wireless	No Update to Provide	11/30/2009	
tw telecom of texas, llc	Backhaul	No Update to Provide	3/10/2010	
United States Cellular Corporation	Mobile Wireless	No Update to Provide	2/15/2011	
Valley Telephone Cooperative, Inc.	Backhaul	No Update to Provide	11/24/2009	
Valley Telephone Cooperative, Inc.	DSL	No Update to Provide	11/24/2009	
Valley Telephone Cooperative, Inc.	Fiber	No Update to Provide	11/24/2009	
Valley Telephone Cooperative, Inc.	Fixed Wireless	No Update to Provide	11/24/2009	
ViaSat, Inc.	Satellite	No Update to Provide	1/8/2010	
Web Fire Communications	DSL	No Update to Provide		
Wes-Tex Telecommunications, Ltd.	Backhaul	No Update to Provide	3/1/2010	
Wes-Tex Telecommunications, Ltd.	Cable	No Update to Provide	3/1/2010	
Wes-Tex Telecommunications, Ltd.	DSL	No Update to Provide	3/1/2010	
Wes-Tex Telecommunications, Ltd.	Fixed Wireless	No Update to Provide	3/1/2010	
West Texas Rural Telephone Cooperative, Inc.	Backhaul	No Update to Provide	3/31/2010	
West Texas Rural Telephone Cooperative, Inc.	Cable	No Update to Provide	3/31/2010	
Wireless Internet Corp	Fixed Wireless	No Update to Provide	11/11/2011	
XO Communications, LLC	Backhaul	No Update to Provide	2/12/2010	
Zeecon Wireless Internet, LLC	Fixed Wireless	No Update to Provide		
Cogent Communications, Inc.	Backhaul	No Update Provided – Use Last		
Digitex.com	Backhaul	No Update Provided – Use Last	5/25/2010	
East Texas DSL	Fixed Wireless	No Update Provided – Use Last	5/25/2010	
ECTISP, Inc.	Fixed Wireless	No Update Provided – Use Last		
Enet Internet Services, LLC	Fixed Wireless	No Update Provided – Use Last		
Greasy Bend Ventures, Inc.	Fixed Wireless	No Update Provided – Use Last	8/16/2010	

Gtek Communications	Backhaul	No Update Provided – Use Last	5/24/2010	
Gtek Communications	Fixed Wireless	No Update Provided – Use Last	5/24/2010	
North Texas Broadband, LLC	Cable	No Update Provided – Use Last	3/1/2010	
NTS Communications	Fiber	No Update Provided – Use Last		
NTS Communications	DSL	No Update Provided – Use Last		
SmartBurst, LLC	Fixed Wireless	No Update Provided – Use Last	8/4/2010	
Smithville System	Fixed Wireless	No Update Provided – Use Last	6/17/2010	
Texas Broadband, Inc.	Fixed Wireless	No Update Provided – Use Last	5/12/2010	
Tier One Converged Networks, Inc.	Fixed Wireless	No Update Provided – Use Last	3/24/2010	
Versalink Enterprises, LLC	Cable	No Update Provided – Use Last	5/11/2010	
Wharton County Electric Cooperative, Inc.	Backhaul	No Update Provided – Use Last	4/15/2010	
Wharton County Electric Cooperative, Inc.	Fixed Wireless	No Update Provided – Use Last	4/15/2010	
Windstream Communications	Backhaul	No Update Provided – Use Last	1/19/2010	
Zayo Bandwidth, LLC	Backhaul	No Update Provided – Use Last		
ETEX Communications, LP	Fixed Wireless	Solicited Initial Data	2/25/2010	
Harris Broadband L.P.	Fiber	Solicited Initial Data	5/7/2012	
Windstream Communications	DSL	Solicited Initial Data	1/19/2010	
281 Communications, Inc.	Fixed Wireless	Non-Responsive to Multiple Attempts		In addition to multiple contact attempts made during previous mapping submission periods, 4 contact attempts were made this period.
CIT - Campbell Information Technology	Fixed Wireless	Non-Responsive to Multiple Attempts		In addition to multiple contact attempts made during previous mapping submission periods, 4 contact attempts were made this period.
Cybercom Corporation	Fixed Wireless	Non-Responsive to Multiple Attempts		In addition to multiple contact attempts made during previous mapping submission periods, 6 contact attempts were made this period.
Fiberlight LLC	Backhaul	Non-Responsive to Multiple Attempts	4/20/2010	In addition to multiple contact attempts made during the previous submission periods, 4 contact attempts were made this period.
FiberTower Corporation	Backhaul	Non-Responsive to Multiple Attempts		In addition to multiple contact attempts made during the last mapping submission period, 4 contact attempts were made this period.
I20 Access	Fixed Wireless	Non-Responsive to Multiple Attempts		In addition to multiple contact attempts made during previous mapping submission periods, 3 contact attempts were made this period.
Lipan Telephone Company, Inc.	DSL	Non-Responsive to Multiple Attempts		In addition to multiple contact attempts made during a previous mapping submission period, 4 contact attempts were made this period.
Local Choice Internet	Fixed Wireless	Non-Responsive to Multiple Attempts		In addition to multiple contact attempts made during the last mapping submission period, 6 contact attempts were made this period.
LSCWeb.Com	Fixed Wireless	Non-Responsive to Multiple Attempts		In addition to multiple contact attempts made during the last mapping submission periods, 4 contact attempts were made this period.
Medicine Park Telephone Company	Backhaul	Non-Responsive to Multiple Attempts		In addition to multiple contact attempts made during the last mapping submission periods, 4 contact attempts were made this period.
Phonoscope Enterprises Group, LLC	Backhaul	Non-Responsive to Multiple Attempts	5/20/2010	In addition to multiple contact attempts made during previous mapping submission periods, 6 contact attempts were made this period.
Reliance Globalcom Services, Inc.	Backhaul	Non-Responsive to Multiple Attempts		In addition to multiple contact attempts made during previous mapping submission periods, 5 contact attempts were made this period.
Centrovision	Cable	Slated Field Audit for Estimated Coverage Analysis		In addition to multiple contact attempts made during previous mapping submission periods, 6 contact attempts were made this period.
South Texas Internet	Fixed Wireless	Slated Field Audit for Estimated Coverage Analysis		In addition to multiple contact attempts made during the last mapping submission period, 5 contact attempts were made this period.
Sterling Cable	Cable	Slated Field Audit for Estimated Coverage Analysis		In addition to multiple contact attempts made during previous mapping submission periods, 6 contact attempts were made this period.
Sterling Cable	Fixed Wireless	Slated Field Audit for Estimated Coverage Analysis		In addition to multiple contact attempts made during previous mapping submission periods, 6 contact attempts were made this period.
Western Broadband	Fixed Wireless	Slated Field Audit for Estimated Coverage Analysis		In addition to multiple contact attempts made during previous mapping submission periods, 3 contact attempts were made this period.

THE STATE OF UTAH
BROADBAND PROJECT

Utah Broadband Project
State Broadband Initiative (SBI) Grant Program
April 1, 2013

Data Submission Methodology Update (Round 7, December 2012)

Provider Data Submission:
The Utah Broadband Project (UBP) communicated with 51 of 54 identified relevant broadband providers that offer services within Utah. Of the 54, 28 providers updated data this round,19 confirmed no updates, 3 providers didn't meet the deadline to send us updates (AFConnect, Cedar Valley Net, TXOX), 1 provider (Zayo) declared itself a non-relevant provider, and 3 providers did not respond (Baja Broadband, HNS License Sub, and TKS Inc.), despite repeated attempts to engage with these providers. In the case of the non-responding providers, it is assumed that their coverage area and speed remained unchanged.

Again, this round, the Utah Broadband Project invited broadband providers to submit designated commercial service separately from residential/consumer service . We used the NTIA Data Model Guidelines to determine when to mark census blocks and road segments service with an end user category of "Governmental, Small Business, Medium, or Large Enterprise". Several providers clarified their different service offerings to commercial and residential customers.

Three new providers were engaged: AFConnect, Connext and Cedar Valley Net. Data was received from Connext and is included in this submission. Data is expected from Cedar Valley Net and AFConnect for the next submission round.

Coverage data was edited to match the 2012 TIGER Census Utah State Boundary. This change mainly affected satellite provider's coverage areas.

Community Anchor Data Submission:
The Community Anchor Institutions data layer has been completely rebuilt for this submission round. It includes the majority of locations Utah considers as Community Anchor Institutions. Numerous broadband attributes including technology of transmission, broadband speeds and public WiFi availability have been updated or added for locations.

Where possible the CAIID has been populated for Libraries to include "FSSCKEY" and "FSCSSEQ" values in addition to "NCES" codes for Schools.

Some overlap between the Utah Education Network (UEN), The State's Wide Area Network (WAN) and other Community Anchor Institution locations is expected as, in a few cases, offices within the same organization and/or facility are served by different networks. Effort has been taken to reduce duplicate CAI data reported from more than one source at other locations.

UBP has run into a considerable amount of pushback from various Community Anchor Institutions, in

particular from Federal government offices, to disclose broadband subscription information. In some cases we were only provided technology of transmission information and a confirmation that the location has broadband speeds greater than 200 Kbps up and 768 Kbps down.

Map Disclaimer

Broadband service availability and characteristics are depicted as derived from data assembled by the Utah Broadband Project. Data sources include biannual broadband service provider submissions and publicly available sources. Data has been modified, where necessary, to meet broadband mapping standards set by the National Telecommunications and Information Administration (NTIA).

Broadband service availability is displayed per NTIA specifications which include technology and speed categories and the generalization of non-wireless service availability information to either U.S. Census blocks (where smaller than 2 sq. miles) or road segments.

Speeds shown are the 'maximum advertised' for the geographic features depicted, and must exceed 0.768 Mbps download and 0.2 Mbps upload (NTIA minimum definition of broadband) to be included. Actual speeds may vary within and along census blocks and roads due to the granularity and currency of the data, technological limitations, and service plan limitations. Users of this data and associated map visualizations are encouraged to inquire directly to providers for current service availability and speed.

All information presented on the Utah's interactive broadband map is for general reference purposes only and may contain errors and omissions. The State of Utah makes no warranty with respect to information available, express or implied, including but not limited to the fitness for use for a particular purpose.

The Utah Broadband Project welcomes comments: broadband@utah.gov.

Map Data Description

All broadband mapping data either is sourced directly from a broadband provider, or from working directly with a provider. Utah has 100% current or anticipated participation from the 54 providers identified to date.

Wireless broadband internet data is mapped using coverage area footprints derived from analyzing antennae location, signal strength and terrain. Wireline broadband internet data is mapped using 2010 census blocks for blocks less than two square miles in area, and road segments in cases of larger census blocks.

Once a provider’s broadband coverage is initially mapped, data updates take several forms including GIS files, written descriptions, provider created maps, and verbal and written discussions.

Community Anchor Institution locations are mapped using supporting resources from Utah’s State Geographic Information Database (SGID). Broadband Internet subscription information comes from

a variety of sources including the Utah Education Network, the State of Utah Department of Technology Services, the Utah Telehealth Network, and direct pnone or email correspondence with onsite staff at identified facilities.

Confidential data not shown on the map is also collected by the Project, and submitted to the NTIA. This information includes a limited number of middle and last mile broadband infrastructure points.

Validation

The Project's data submission is compliant with the SBDD v.10.1 Data Transfer Model and the State Broadband Data and Development NOFA. All broadband data that does not agree with the allowable values and ranges in the Data Transfer Model is studied and adjusted to agree with the data model or noted as exceptions as appropriate.

Another important part of data validation is the project's data intake and processing flow. In summary, our data flow consists of:

- Initial evaluation of data submission and initial documentation.
    - Recordation what was submitted by provider.
    - Verification that the data update is usable.
- Make data submission updates and put the data in the NTIA data model.
- Detailed evaluation and documentation.
    - Document details of the data and the data processing steps.
    - Review the provider's changes from previous submissions for consistency between what is in the data and what discussions have been made with providers.
- Create data feedback for provider to review.

Aerial photography, address location services, census block geometry, and road segment geometry used for broadband service mapping and for quality control of the broadband data are from public domain resources in the SGID.

Verification

All Broadband data received by the project is reviewed for overall verification. Besides our initial verification, other sample verification methods are listed below.

- The project maintains archives and documentation of a given provider's data over time, and changes are noted and verified as to their plausibility. All data related interaction with a provider since the project began in June 2010 is also documented. This provider submission history is periodically referred to in order to guide correspondence needs and special handling of the submission data.

- Visual inspection and comparisons, to past submissions and other providers data, are performed to evaluate spatial and attribute logic
- Provider websites are explored to confirm maximum advertised speeds.
- For each provider's geographical extent, examination of areas that are not served or are underserved is completed and discussed with the provider for accuracy.
- Every time the project receives updates from a broadband provider, providers are asked to review the update to verify that the data or updates have been prepared accurately. The biggest source of feedback for providers is being able to interact one on one with their specific data on the Utah Broadband Interactive Map. ***The February release of the Utah Broadband Interactive Map allows for custom URLs to be made that allow entry to the map with only specific speeds, tech types, providers, and geographic extent shown. This allows a provider specific URL to be passed back to the provider for review of their data*** (example). Providers can do this on their own or with the project during a scheduled conference.
- Local telecom territories are used to verify reported DSL coverage areas.
- Wireless Drive Test: In July 2011, the Utah Broadband Project contracted with Isotrope LLC, a Massachusetts-based company, to perform a drive test to assess wireless broadband services and capabilities throughout the state. The drive test data, collected by traversing over 6000 miles of the state , provides a snapshot in time of mobile broadband speeds, signal strength and technologies. After being collected, the drive test data was used to assess broadband provider data and was used in verification discussions with wireless providers. It was also provided to all wireless providers for their own use.
- Prior to July 2011, commercial wireless data such as the American Roamer data was used to verify reported wireless coverage areas.
- In order to map the wireless data more accurately, whenever possible the project mapping team has worked with providers to acquire wireless coverage areas based on signal propagation modeling. If a provider does not have the capacity to submit a propagated coverage area, the project encourages providers to provide tower locations and antenna locations and specifications to the project mapping team that are then used for a viewshed to create a propagated coverage area.

Additional Utah Broadband Maps and Data Resources

The Utah Broadband Project maintains additional maps beyond the online interactive map. These are available on request and include maps of broadband coverage availability, best available speed, and highest available speeds and technologies in Utah. The project is also willing to work on other specific mapping requests.

About the State Level Broadband Map

The Utah Broadband Interactive Map was developed and is hosted by the Utah Automated

Geographic Reference Center (AGRC) utilizing data complied by the Project from broadband providers and public sources, including Utah's State Geographic Information Database (SGID) which is utilized extensively for locating addresses, locating geographic places, and displaying background maps.

Goals

- The map attempts to provide consumers, community leaders, and broadband providers with a comprehensive map-based view of non-confidential data compiled by the Utah Broadband Project.
- The map is also meant to be used by policy makers or policy maker supporters, such as the Utah Broadband Advisory Council.
- The map serves as a basis of discussion with Broadband Providers to verify accuracy of data.
- The data on the map is used in our twice yearly submission to the NTIA.

Commonwealth of Virginia
State Broadband Data Development

Virginia Center for Innovative Technology

Virginia Information Technologies Agency
Virginia Geographic Information Network

Virginia Tech
Center for Geospatial Information Technology

NTIA STATE BROADBAND DATA DEVELOPMENT
ROUND 7 – April 2013 SUBMISSION

Summary of Virginia Submission

The Virginia Center for Innovative Technology (CIT) was designated by the Governor of Virginia as the primary point of contact for all Commonwealth of Virginia participation in the National Broadband Mapping Project. The CIT works in conjunction with the Virginia Information Technologies Agency's (VITA) Virginia Geographic Information Network (VGIN) to review, process, normalize and submit the information outlined in the National Telecommunications and Information Administration's (NTIA) Notice of Funding Availability (NOFA) establishing a Virginia iteration of the National Broadband Map.

The spring 2013 submission to the NTIA includes data from 61 broadband service providers with unique federal identifications delivered in various formats ranging from GIS shape files to text files detailing broadband availability. This includes providers who did not submit changes for the April 1, 2013 deadline so the Fall 2012 submission data was carried forward to complete the dataset.

A summary of the spring 2013 submission is below:

Census Blocks less than 2 square miles	399426
Road Segments outside of census blocks less than 2 square miles	54501
Wireless polygon coverage area(s)	38
Middle Mile points	429
Community Anchor Institution points	3485

All participating broadband providers sent in their transmission technology type and advertised speed information for wireless polygons, census block, or road centerline segments.

There are a total of 174 broadband providers that have been identified through various sources within the Commonwealth of Virginia as of April 1, 2013. There are 66 providers who are participating in the national program and 108 who have not responded to a call for data. Virginia has an on-going effort to contact the providers who have not responded to offer any assistance needed for them to participate.

As of the fall 2012 NTIA SBDD submission, Virginia has elected to no longer submit addresses as point data. All address data has been geocoded to the VA road centerline locater and road segments were then selected by location and loaded to the NTIA data model. This processing procedure creates a redistribution of the total record counts by feature class.

Virginia Broadband Data Verification and Validation

Verification Techniques

In the fall of 2010, the Virginia broadband mapping team subcontracted with Apex-CoVantage to provide the following one-time broadband data verification techniques using standardized questionnaires for the Commonwealth of Virginia:

- Telephone interviews
- Field (door to door) interviews
- Direct mailings
- Drive Testing
- GPS data collection at field interview sites

A total of 2,421 surveys were conducted, with 616 in-person and 1,805 by telephone.

Validation Methods

Using the NTIA definitions for served/under-served/unserved combined with Census demographics and Virginia broadband availability data, the Center for Geospatial Information Technology (CGIT) mapping team produced an estimated Broadband "serve-ability" Census Block map for Virginia. From this the Apex team then identified a geographically stratified (rural/urban) statistically significant sample size for which to apply the above data verification techniques.

Results

The effort resulted in the following findings:

- Surveys confirming Wireline Provider access: 97.3%
- Surveys confirming Wireless Provider Access: 99.7%
- Surveys confirming Internet Service Provider: 91.1%

In addition, the survey questionnaires confirmed valuable location information (lat/long & address) along with details about internet service provider and demographic information.

Base Map Data

VGIN maintains statewide imagery, road centerline, and address point feature classes. VGIN also maintains a series of statewide base map data sets, or partnerships with commercial entities which allow the granularity of data necessary to support the National

Broadband Mapping Project. The following Virginia and Federal data sets are used in SBDD data processing.

Road Centerlines (RCL) – VGIN maintains a statewide road centerline feature class that is updated quarterly using locality centerline submissions. This road centerline database contains address range information when it is provided by the locality. The RCL database is used to generate a geocoding service which is an interpolated point along a centerline that is fed into the Virginia statewide composite geocoding web service.

TIGER 2010 Census Blocks – 2010 Census geometry that is available to the broadband mapping project for location and presentation of broadband data.

Broadband Provider Processing Environment

To support the processing of broadband provider information separately, a broadband provider specific staging geodatabase was created. Each broadband provider participating in the spring 2013 NTIA submission had its own geodatabase and data was processed completely independent of all other broadband providers, allowing providers to move through the process at different rates. This procedure also allowed the correction of any data problems specific to broadband providers without affecting the entire submission database.

A naming convention for each selection set feature class was used and called "NTIA_" and the feature class type. "NTIA_Roads" were loaded to the transfer data model feature class BB_Service_RoadSegment, "NTIA_Census_Blocks" were loaded to the transfer data model BB_Service_CensusBlock feature class, and depending on provider category "NTIA_Wireless" was loaded to the transfer data model BB_Service_Wireless. Once the broadband provider data was processed to a point in its native feature class in the staging geodatabase which fully conformed to the NTIA specifications, it was included in the Virginia submission for quality control and subsequent delivery.

Generalized Broadband provider Data Processing

Broadband provider processing was accomplished using selection set feature classes and the appropriate geometry. Data was reported in many different categories and each of these reporting formats was handled differently. While there were other NTIA SBDD data sets that were provided differently from providers (pricing, speed by region), they were considered separate use cases than base layer data since the output of these secondary data sets was not primarily geospatial. The following are GIS data layers reported in the SBDD data model.

Wireless Service Area Polygon Reporting – Service Area Polygons were reported by Wireless Broadband providers and required little processing to be included in the NTIA

SBDD data model. Typical inclusion processes included attribute validation and use of the ESRI Simple Data Loader or Copy and Paste. A small number of providers needed assistance in compiling their data and were referred to the staff at CGIT. The provider supplied the antenna data needed for a propagation model. When the polygons from the model were completed and approved by the provider they were then sent to VGIN for including in the NTIA submittal. Specific information about the modeling method is available by calling VGIN.

Census Block Reporting – Broadband providers reporting broadband availability on a census block basis submitted it in list form a majority of the time. These lists came in the form of spreadsheets and text files. These lists were normalized into spreadsheets and then imported into a provider staging geodatabase table. An attribute join using the full census block ID was completed to the Selection Set census block feature class. Census blocks less than 2 square miles were exported to a separate feature class to use in processing address and/or road centerline data also sent by the provider.

Address Reporting – Some providers reported data in census blocks less than two square miles but also included customer addresses for blocks greater than two square miles.

The majority of wireline providers reporting broadband availability on a service address basis submitted data which DID NOT differentiate where their addresses fell within blocks less than or greater than two square miles. In order to convert the provider's data to the NTIA spatial parameters of block and centerline differentiation, all lists were converted to spreadsheets and were incorporated into the SBDD submission in a two tiered approach using the NTIA and VGIN's understanding of broadband coverage:

1) Geocoded to VGIN's address point locator, then blocks less than two square miles were selected where a geocoded point fell within.
2) Addresses that did not achieve a result from the address point geocode, or were outside of blocks less than two square miles, were re-geocoded to VGIN's Road Centerline locator and point results were spatially joined to the selection set RCL data providing a centerline feature output. Addresses were first geocoded against the statewide address point database.

Road Segment Address Reporting – Broadband providers reporting broadband availability using road address ranges submitted the data in a non-spatial list in a majority of cases, although several providers did send in TIGER lines or VA RCL data. These lists were normalized into a series of spreadsheets when processing the individual provider. The data was either used in joining to census features by Tiger Line ID (TLID) and then selecting by location from the selection set RCL data or used raw in geospatial format and selected.

Community Anchor Institutions (CAI) –

CAI Overview:

The purpose of the CAI layer is to identify the location of community anchor institutions and the availability of broadband at that location. The facilities defined by NTIA as a CAI for this purpose are K-12 school, library, medical/healthcare facility, public safety institution, post-secondary institution, or a community support facility. Effort was focused on K-12 schools, libraries, medical/healthcare facilities, public safety institutions and post-secondary institutions.

Resources and data were obtained from several Government agencies and organizations: National Telecommunications and Information Administration (NTIA), Center for Innovative Technology (CIT), Virginia Tech Center for Geospatial Information Technology (CGIT), Virginia Information Technologies Agency (VITA), Virginia Department of Emergency Management (VDEM), Virginia Economic Development Partnership (VEDP), Virginia Department of Health (VDH), Library of Virginia (LVA) and the National Center for Education Statistics (NCES).

Public school K-12 data was processed by VDEM by collection of the data from the Virginia Department of Education, geocoded, and submitted to VGIN. VDEM has agreed to update the data yearly before Labor Day.

Post-secondary institution data was obtained from the VEDP, http://gis.vedp.org/data_resources.aspx. The layer called 'College and Universities" dataset was downloaded and extracted. The most recent update of the dataset occurred on 12/12/2012. VEDP has agreed to update the data yearly before Labor Day.

Medical/Healthcare data was carried over from the October 1 submittal to the NTIA with slight alterations made to individual attributes and the expansion of our dataset to include facilities other than Hospitals. In the future, data will be submitted to VGIN by VDH. VDH will make regular, yearly, updates to the dataset in November.

Updates to the library data is the responsibility of VGIN. The Library of Virginia houses a comprehensive list of public libraries in Virginia which will be used by VGIN to make updates. Updates will occur biannually in preparation for the NTIA submittal.

Public safety data has been obtained in a variety of ways. Law enforcement data, including police and sheriff stations/precincts, was submitted to VGIN by VDEM. Initially, the data had no broadband attribution. CIT has gathered broadband data for various public safety entities through localized efforts. At this time, fire, police and U.S. Military installations are included in the public safety category.

CAI Processing & Submittal:

A call for provider CAI data was sent out for the Spring 2013 submission and several providers responded with tabular data of Transmission technologies, speeds, and additional attributes for the SBDD data model. Those providers were Shentel, Citizens, Northern Neck Wifi and MediaCom.

CGIT held speed tests in 2009 and this information was applied to the NTIA SBDD transfer data models of the past. With the inclusion of attribute values for subscriber upload and subscriber download speeds with the most recent NTIA model for the Spring 2012 submission, CGIT provided VGIN with an export of its most recent database to include speed testing held in 2011 in the SBDD Transfer Data model CAI feature class. Included were a subset of features based on CAI category and were not the entire CAI feature class so features in the VT data were then applied to the VGIN submission feature class.

Between the Fall of 2012 and Spring of 2013 submissions, VGIN Staff standardized a process for updates to the Virginia statewide CAI data set. Data must be obtained from the primary business owner then quality assurance is performed to normalize the data. Speed data is aggregated by VGIN through provider submission, Virginia Tech speed testing, and VGIN estimation.

A broadband speed hierarchy was established to identify a maximum broadband speed for each CAI. Provider data is assumed most accurate, CGIT speed data is secondary, and VGIN speeds are assigned only if no other speed data is available. Using a geo-processing model, VGIN speeds are created by extracting speed data from census blocks that contain the CAI point. In the case of two speeds available within the particular census block, the maximum available speed is chosen.

Virginia's CAI data has additional attribution beyond the NTIA data model due to the source of the VA data set. VGIN and CGIT both house CAI data although the record counts for tables are not identical due to the individual attribute purposes. The master VGIN geospatial feature class is used in submission to the SBDD project while changes from CGIT are generally conflated.

Total CAI points submitted demonstrate a decrease for the spring 2013 submittal. This decrease can be attributed to the Virginia broadband team participants increased reporting standards demonstrated. VGIN has decided to not submit private school K-12 data because a legitimate business owner of the data has yet to be identified. The exclusion of private school data represents the primary reason for the decrease in CAI points submitted. It is VGIN's goal to verify private school K-12 data for the fall 2013 submittal. Other decreases in CAI points can be attributed to VGIN's decisions to exclude county government offices and community support locations until a point at which data can be more accurately reported. At this time, effort is being made to identify primary business owners of these datasets so that data quality can be assured.

Middle Mile – The majority of providers do not send middle mile data. When it is received it is converted into a geodatabase table in the broadband provider's staging geodatabase. An add XY function was performed in ArcMap and XY events were exported as a new feature class. Inside the provider's staging geodatabase, the NTIA SBDD data model feature class named BB_ConnectionPoint_MiddleMile was imported and renamed NTIA_middle_mile. Data was either loaded to this feature class and all appropriate fields were calculated based on the XY event in order to load data spatially or if only a handful of points were provided the data was manually edited in an edit session.

Pricing - If nominal weighted subscriber speed was available from a broadband provider, the data was placed into an excel spreadsheet for the spring 2012 submission which followed the format of requested text output information from NTIA. It was then output to a requested tab delimited text file for the release. All providers who had previously sent in pricing data but had not submitted an update for the spring 2012 release were carried over into the spring 2012 pricing spreadsheet.

Speed based on CMA/MSA/RSA - If speed was available by cellular market area or MSA/RSA and provided to CIT and VGIN, this information was placed into a newly created SDE feature class which tracked the most current speed from a provider. If the provider was a new or updated submission, the feature class was updated with the most recent speed data. All archive speed data was located and custom areas of interest were added as polygons in this feature class.

Individual Broadband Provider Data

The following Broadband Providers submitted data for the spring 2013 NTIA submission.

AT&T Mobility, LLC
DBA Name: AT&T Mobility, LLC
FRN: 0004979233
Provider Type: Wireline
Provider Data Format: GIS shape file
Date of First Submission: 10/1/2011
Date of Last Submission: 4/1/2013
Transmission Technology Types: 80
Percentage of Unmatched Addresses: N/A
Map Feature Record Count
Middle Mile: 1
Wireless Polygons 3

B2X Online, Inc.
DBA Name: B2X Online, Inc.
FRN: 0016101412
Provider Type: Wireless

Provider Data Format: GIS
Date of First Submission: 4/1/2013
Date of Last Submission: 4/1/2013
Transmission Technology Types: 70
Percentage of Unmatched Addresses: N/A
Map Feature Record Count:
Wireless Polygons: 5 (Propagation models)

Blue Ridge Internetworks
DBA Name: Blue Ridge Internetworks
FRN: 0022353980
Provider Type: Wireline
Provider Data Format: Tabular
Date of First Submission: 4/1/2013
Date of Last Submission: 4/1/2013
Transmission Technology Types: 50
Percentage of Unmatched Addresses: 0.98%
Map Feature Record Count:
CB < 2 Sq Mi: 63

Century Telecommunications, Inc.
DBA Name: CenturyLink
FRN: 0018626853
Provider Type: Wireline
Provider Data Format: GIS
Date of First Submission: 4/1/2010
Date of Last Submission: 4/1/2013
Transmission Technology Types: 10
Percentage of Unmatched Addresses
Map Feature Record Count:
Road Segments: 18119
CB < 2 Sq Mi: 31040
Middle Mile: 1

Charter Communications Inc.
DBA Name: Charter Communications Inc.
FRN: 0017179383
Provider Type: Wireline
Provider Data Format: GIS
Date of First Submission: 10/1/2010
Date of Last Submission: 10/1/2012
Transmission Technology Types: 40, 41

Percentage of Unmatched Addresses: N/A
Map Feature Record Count:
Road Segments: 34,305
CB < 2 Sq Mi: 1017, 5512
Middle Mile: 3

Clearwire Corporation
DBA Name: Clear
FRN: 0017775628
Provider Type: Wireless
Provider Data Format: GIS
Date of First Submission: 4/1/2013
Date of Last Submission: 4/1/2013
Transmission Technology Types: 71
Percentage of Unmatched Addresses: N/A
Map Feature Record Count:
Wireless Polygons 1

Comcast Cable Communications, LLC.
DBA Name: Comcast
FRN: 0004441663
Provider Type: Wireline
Provider Data Format: Tabular
Date of First Submission: 8/1/2008
Date of Last Submission: 10/1/2012
Transmission Technology Types: 40, 41
Percentage of Unmatched Addresses: 16.8%
Map Feature Record Count
Road Segments: 6998, 414
CB < 2 Sq Mi: 56611, 1004

Central Virginia Technology Group, LLC.
DBA Name: CVALINK Broadband
FRN: 0020567939
Provider Type: Wireless
Provider Data Format: GIS KML raster file
Date of First Submission: 4/1/2013
Date of Last Submission: 4/1/2013
Transmission Technology Types: 70
Percentage of Unmatched Addresses: N/A
Map Feature Record Count
Wireless Polygons: 1

Leap Wireless International, Inc.
DBA Name: Cricket Communications, Inc.
FRN: 0002963528
Provider Type: Wireless
Provider Data Format: GIS shape file
Date of First Submission: 4/1/2011
Date of Last Submission: 10/1/2012
Transmission Technology Types: 80
Percentage of Unmatched Addresses:
Map Feature Record Count:
Wireless Polygons: 1

Rural Broadband Network Services, LLC.
DBA Name: HighspeedLINK
FRN: 0017649732
Provider Type: Wireless
Provider Data Format: N/A
Date of First Submission: 4/1/2013
Date of Last Submission: 4/1/2013
Transmission Technology Types: 70
Percentage of Unmatched Addresses
Map Feature Record Count
Wireless Polygons: 1

Level 3 Communications, LLC.
DBA Name: Level 3 Communications
FRN: 0003723822
Provider Type: Wireline
Provider Data Format: Tabular
Date of First Submission: 10/1/2011
Date of Last Submission: 4/1/2013
Transmission Technology Types: 50
Percentage of Unmatched Addresses: 13% Middle Mile, 5% address points
Map Feature Record Count:
Road Segments: 8
CB < 2 Sq Mi: 903
Middle Mile: 136

Mediacom Southeast, LLC.
DBA Name: Mediacom
FRN: 0004036778
Provider Type: Wireline
Provider Data Format: Tabular

Date of First Submission: 4/1/2012
Date of Last Submission: 4/1/2013
Transmission Technology Types: 40
Percentage of Unmatched Addresses: 19.7%
Map Feature Record Count:
Road Segments: 1
CB < 2 Sq Mi: 7

MegaPath Corporation
DBA Name: MegaPath Corporation
FRN: 0003753787
Provider Type: Wireline
Provider Data Format: Tabular
Date of First Submission: 10/1/2010 (as Covad Communications Company)
Date of Last Submission: 4/1/2013
Transmission Technology Types: 10, 20, 30
Percentage of Unmatched Addresses: 9.7%
Map Feature Record Count:
Road Segments: 0, 134, 743
CB < 2 Sq Mi: 33814, 25347, 59972
Middle Mile: 6

Gans Communications, LP.
DBA Name: MetroCast Communications
FRN: 0018547471
Provider Type: Wireline
Provider Data Format: Tabular
Date of First Submission: 4/1/2010
Date of Last Submission: 4/1/2013
Transmission Technology Types: 40
Percentage of Unmatched Addresses: N/A
Map Feature Record Count
Road Segments: 1530
CB < 2 Sq Mi: 11649

Northern Neck Wireless Internet Services, LLC.
DBA Name: NNWIFI, LLC.
FRN: 0017338054
Provider Type: Wireless
Provider Data Format: GIS
Date of First Submission: 4/1/2010
Date of Last Submission: 4/1/2013
Transmission Technology Types: 70
Percentage of Unmatched Addresses: N/A

Map Feature Record Count:
Wireless Polygons: 1 (propagation model)

nTelos Wireless, Inc.
DBA Name: Richmond 20 MHz LLC, West Virginia PCS Alliance LLC, nTelos Inc., Virginia PCS Alliance LLC
FRN: 0001656180, 0002049328, 0005849518, 0002051720
Provider Type: Wireless
Provider Data Format: GIS shapefile
Date of First Submission: 4/1/2010
Date of Last Submission: 4/1/2013
Transmission Technology Types: 80
Percentage of Unmatched Addresses: N/A
Map Feature Record Count:
Wireless Polygons: 4

Peoples Mutual Telephone Company
DBA Name: FairPoint Communications
FRN: 0002071116
Provider Type: Wireline
Provider Data Format: Tabular
Date of First Submission: 10/1/2010
Date of Last Submission: 4/1/2013
Transmission Technology Types: 10
Percentage of Unmatched Addresses: 2.2%
Map Feature Record Count:
Road Segments: 66
CB < 2 Sq Mi: 854

Shentel Cable Company
DBA Name: Shentel
FRN: 0021657853
Provider Type: Wireline
Provider Data Format: N/A
Date of First Submission: 4/1/2012
Date of Last Submission: 4/1/2013
Transmission Technology Types: 40
Percentage of Unmatched Addresses:
Map Feature Record Count
Road Segments: 691
CB < 2 Sq Mi: 11027
Middle Mile: 16

Shentel Service Company
DBA Name: Shentel

FRN: 0022045405
Provider Type: Wireline
Provider Data Format: N/A
Date of First Submission: 4/1/2012
Date of Last Submission: 4/1/2013
Transmission Technology Types: 10
Percentage of Unmatched Addresses:
Map Feature Record Count
Road Segments: 411
CB < 2 Sq Mi: 2402
Middle Mile: 79

Shentel Telephone Company
DBA Name: Shentel
FRN: 0002072668, 0020110672
Provider Type: Wireline
Provider Data Format: N/A
Date of First Submission: 4/1/2012
Date of Last Submission: 4/1/2013
Transmission Technology Types: 50
Percentage of Unmatched Addresses:
Map Feature Record Count
Middle Mile: 35, 2

Sidera Networks LLC
DBA Name: Sidera Networks
FRN: 0006254403
Provider Type: Wireline
Provider Data Format: N/A
Date of First Submission: 4/1/2012
Date of Last Submission: 4/1/2013
Transmission Technology Types: 50
Percentage of Unmatched Addresses: 9.1%
Map Feature Record Count
Middle Mile: 10

Skyline Telephone Membership Corporation
DBA Name: Skyline Telephone Membership Corporation
FRN: 0001952555
Provider Type: Wireline
Provider Data Format: Tabular
Date of First Submission: 10/1/2012
Date of Last Submission: 4/1/2013
Transmission Technology Types: 10, 50

Percentage of Unmatched Addresses: 9%
Map Feature Record Count:
CB < 2 Sq Mi: 4, 10

Sprint Nextel Corporation
DBA Name: Sprint
FRN: 0003774593
Provider Type: Wireless
Provider Data Format: GIS shapefile
Date of First Submission: 4/1/2010
Date of Last Submission: 4/1/2013
Transmission Technology Types: 80
Percentage of Unmatched Addresses: N/A
Map Feature Record Count
Middle Mile: 2
Wireless Polygons: 3

Cebridge Acquisition LLC, Cequel III Communications I, LLC.
DBA Name: Suddenlink Communications
FRN: 0014848808, 0008628562
Provider Type: Wireline
Provider Data Format: Tabular
Date of First Submission: 10/1/2012
Date of Last Submission: 4/1/2013
Transmission Technology Types: 40, 41
Percentage of Unmatched Addresses: 2.3%
Map Feature Record Count
Road Segments: 245, 4
CB < 2 Sq Mi: 385, 1

T-Mobile USA, Inc.
DBA Name: T-Mobile
FRN: 0006945950
Provider Type: Wireless
Provider Data Format: GIS shapefile
Date of First Submission: 4/1/2010
Date of Last Submission: 4/1/2013
Transmission Technology Types: 80
Percentage of Unmatched Addresses: N/A
Map Feature Record Count:
Middle Mile: 1
Wireless Polygons: 3

Amelia Telephone Corporation

DBA Name: TDS Telecom
FRN: 0002073526
Provider Type: Wireline
Provider Data Format: Tabular
Date of First Submission: 4/1/2010
Date of Last Submission: 4/1/2013
Transmission Technology Types: 10, 50
Percentage of Unmatched Addresses
Map Feature Record Count
Road Segments: 433, 2
CB < 2 Sq Mi: 139, 0
Middle Mile: 1

New Castle Telephone Company
DBA Name: TDS Telecom
FRN: 0003767399
Provider Type: Wireline
Provider Data Format: Tabular
Date of First Submission: 4/1/2010
Date of Last Submission: 4/1/2013
Transmission Technology Types: 10, 50
Percentage of Unmatched Addresses
Map Feature Record Count
Road Segments: 231
CB < 2 Sq Mi: 225
Middle Mile: 1

Virginia Telephone Company
DBA Name: TDS Telecom
FRN: 0002058261
Provider Type: Wireline
Provider Data Format: Tabular
Date of First Submission: 4/1/2010
Date of Last Submission: 4/1/2013
Transmission Technology Types: 10, 50
Percentage of Unmatched Addresses
Map Feature Record Count
Road Segments: 101, 9
CB < 2 Sq Mi: 112, 0
Middle Mile: 1

Time Warner Cable, LLC.
DBA Name: Time Warner Cable (TWC)
FRN: 0007556251

Provider Type: Wireline
Provider Data Format: GIS
Date of First Submission: 4/1/2010
Date of Last Submission: 4/1/2013
Transmission Technology Types: 40
Percentage of Unmatched Addresses: N/A
Map Feature Record Count:
Road Segments: 1722
CB < 2 Sq Mi: 3361

U.S. Cellular
DBA Name: U.S. Cellular
FRN: 0004372322
Provider Type: Wireless
Provider Data Format: GIS shapefile
Date of First Submission: 4/1/2013
Date of Last Submission: 4/1/2013
Transmission Technology Types: 80
Percentage of Unmatched Addresses: N/A
Map Feature Record Count:
Wireless Polygons: 3

Cellco Partnership and its Affiliated Entities
DBA Name: Verizon Wireless
FRN: 003290673
Provider Type: Wireless
Provider Data Format: GIS shapefile
Date of First Submission: 4/1/2009
Date of Last Submission: 4/1/2013
Transmission Technology Types: 80
Percentage of Unmatched Addresses: N/A
Map Feature Record Count:
Wireless Polygons: 4

Verizon Virginia, Inc.
DBA Name: Verizon Virginia, Inc.
FRN: 0002073203
Provider Type: Wireline
Provider Data Format: Tabular
Date of First Submission: 8/20/2008
Date of Last Submission: 4/1/2013
Transmission Technology Types: 10, 50
Percentage of Unmatched Addresses: N/A
Map Feature Record Count:

Road Segments: 13973, 1476
CB < 2 Sq Mi: 79962, 31496
Middle Mile: 12

Carryover Providers from Fall 2012

Many providers did not submit updates for the spring 2013 so the data they submitted in the Fall 2012 was carried over. These broadband providers are listed below.

CoxCom Inc
DBA Name: Cox Communications
FRN: 0001524461
Provider Type: Wireline
Provider Data Format: Tabular
Date of First Submission: 4/1/2010
Date of Last Submission: 4/1/2013
Transmission Technology Types: 40
Percentage of Unmatched Addresses: 15%
Map Feature Record Count
Road Segments: 736
CB < 2 Sq Mi: 30,191
Middle Mile: 4

MGW Networks, LLC.
DBA Name: MGW Networks, LLC.
FRN: 0019225366
Provider Type: Wireline/Wireless
Provider Data Format: Tabular
Date of First Submission: 10/1/2010
Date of Last Submission: 4/1/2011
Transmission Technology Types: 10
Percentage of Unmatched Addresses
Map Feature Record Count
Road Segments: 1008
CB < 2 Sq Mi: 1850

Nextlink Wireless, Inc.
DBA Name: Nextlink Wireless, Inc.
FRN: 0014286934
Provider Type: Wireline
Provider Data Format: Tabular
Date of First Submission: 4/1/2010
Date of Last Submission: 4/1/2010
Transmission Technology Types: 30

Percentage of Unmatched Addresses
Map Feature Record Count
Road Segments
CB < 2 Sq Mi: 29

Buggs Island Telephone Cooperative
DBA Name: BIT Communications
FRN: 0002031698
Provider Type: Wireline/Wireless
Provider Data Format: Tabular
Date of First Submission: 4/1/2010
Date of Last Submission: 10/1/2012
Transmission Technology Types: 10+WIFI
Percentage of Unmatched Addresses
Map Feature Record Count
Road Segments: 2182

BVU OptiNet
DBA Name: Bristol Virginia Utilities
FRN: 0006823991
Provider Type: Wireline
Provider Data Format: Tabular
Date of First Submission: 4/1/2010
Date of Last Submission: 4/1/2010
Transmission Technology Types: 50
Percentage of Unmatched Addresses
Map Feature Record Count
Road Segments: 190
CB < 2 Sq Mi: 869

Citizens Cablevision, Inc.; Citizens Telephone Cooperative
DBA Name: Citizens
FRN: 0009485343; 0004381422
Provider Type: Wireline
Provider Data Format: Tabular
Date of First Submission: 4/1/2010; 9/1/2008
Date of Last Submission: 4/1/2010; 4/1/2013
Transmission Technology Types: 41; 10
Percentage of Unmatched Addresses
Map Feature Record Count
Road Segments: 61, 441
CB < 2 Sq Mi: 120, 703

Highland Telephone Cooperative

DBA Name: Highland Telephone Cooperative
FRN: 0004318846
Provider Type: Wireline
Provider Data Format: Tabular
Date of First Submission: 4/1/2010
Date of Last Submission: 10/1/2012
Transmission Technology Types: 10
Percentage of Unmatched Addresses
Map Feature Record Count
CB < 2 Sq Mi: 150
Middle Mile: 2

Lumos Networks
DBA Name: Lumos Networks, R&B Networks, Roanoke and Botetourt Telephone Company
FRN: 002073138, 0003775301, 0003775244, 0003742442
Provider Type: Wireline
Provider Data Format: Tabular
Date of First Submission: 10/1/2010
Date of Last Submission: 10/1/2012
Transmission Technology Types: 10, 50
Percentage of Unmatched Addresses
Map Feature Record Count
Road Segments: 694
CB < 2 Sq Mi: 3951
Middle Mile: 67

Wintergreen Community Cablevision
DBA Name: Nelson Cable, Inc.
FRN: 0000900287
Provider Type: Wireline
Provider Data Format: Tabular
Date of First Submission: 6/12/2009
Date of Last Submission: 4/1/2010
Transmission Technology Types: 10
Percentage of Unmatched Addresses
Map Feature Record Count
Road Segments: 197
CB < 2 Sq Mi: 108

Nelson County
DBA Name: Nelson County
FRN: 0002033850
Provider Type: Wireline

Provider Data Format: Tabular
Date of First Submission: 10/1/2012
Date of Last Submission: 10/1/2012
Transmission Technology Types: 50
Percentage of Unmatched Addresses: N/A
Map Feature Record Count:
Middle Mile: 4

New Hope Telephone Company
DBA Name: New Hope Telephone Coop.
FRN: 0002071579
Provider Type: Wireline
Provider Data Format: Tabular
Date of First Submission: 10/1/2010
Date of Last Submission: 10/1/2010
Transmission Technology Types: 10
Percentage of Unmatched Addresses
Map Feature Record Count
Road Segments: 31
CB < 2 Sq Mi: 985

Roadstar Internet, Inc.
DBA Name: Roadstar Internet, Inc.
FRN: 0013445358
Provider Type: Wireless
Provider Data Format: Tabular
Date of First Submission: 10/1/2010
Date of Last Submission: 10/1/2012
Transmission Technology Types: 71
Percentage of Unmatched Addresses
Map Feature Record Count:
Wireless Polygons: 1

StarBand Communications Inc.
DBA Name: StarBand Communications Inc.
FRN: 0005087457
Provider Type: Satellite
Provider Data Format: Email stating Starband covers the entire state
Date of First Submission: 4/1/2012
Date of Last Submission: 10/1/2012
Transmission Technology Types: 60
Percentage of Unmatched Addresses: N/A
Map Feature Record Count:
Wireless Polygons: 1

Starpower Communications, LLC.
DBA Name: RCN Telecom Services LLC
FRN: 0003735016
Provider Type: Wireline
Provider Data Format: Tabular
Date of First Submission: 10/1/2011
Date of Last Submission: 10/1/2012
Transmission Technology Types: 40, 41
Percentage of Unmatched Addresses
Map Feature Record Count:
CB < 2 Sq Mi: 142
Middle Mile: 2

Scott County Telephone Cooperative
DBA Name: SCTC
FRN: 0002069862
Provider Type: Wireline
Provider Data Format: N/A
Date of First Submission: 2/9/2009
Date of Last Submission: 10/1/2012
Transmission Technology Types: 10, 50
Percentage of Unmatched Addresses
Map Feature Record Count
Road Segments: 832
CB < 2 Sq Mi: 2963

Sunset Digital Communications, Inc.
DBA Name: Sunset Digital Communications, Inc.
FRN: 0000826320
Provider Type: Wireline
Provider Data Format: GIS
Date of First Submission: 10/1/2011
Date of Last Submission: 10/1/2011
Transmission Technology Types: 50
Percentage of Unmatched Addresses: N/A
Map Feature Record Count:
Road Segments: 778
CB < 2 Sq Mi: 1522
Middle Mile: 20

ViaSat, Inc.
DBA Name: ViaSat Communications, Inc.

FRN: 0007843766
Provider Type: Satellite
Provider Data Format: GIS shapefile
Date of First Submission: 4/1/2012
Date of Last Submission: 4/1/2012
Transmission Technology Types: 60
Percentage of Unmatched Addresses: N/A
Map Feature Record Count:
Wireless Polygons: 2

XO Communications, LLC.
DBA Name: XO Communications Services, Inc.
FRN: 0006275945
Provider Type: Wireline
Provider Data Format: Tabular
Date of First Submission: 4/1/2010
Date of Last Submission: 10/1/2012
Transmission Technology Types: 10, 20, 30
Percentage of Unmatched Addresses
Map Feature Record Count:
Road Segments: 1
CB < 2 Sq Mi: 1206

The Wired Road
DBA Name: The Wired Road
FRN: 0020153854
Provider Type: Wireless
Provider Data Format: Tabular
Date of First Submission: 10/1/2010
Date of Last Submission: 10/1/2010
Transmission Technology Types: 70
Percentage of Unmatched Addresses: N/A
Map Feature Record Count
Middle Mile: 1
Wireless Polygons: 1

Virginia Mountain Micro
DBA Name: iGo Technology
FRN: 0018713800
Provider Type: Wireless
Provider Data Format: Tabular
Date of First Submission: 4/1/2010
Date of Last Submission: 4/1/2010
Transmission Technology Types: 70

Percentage of Unmatched Addresses: N/A
Map Feature Record Count:
Wireless Polygons: 1

Hughes Network Systems, LLC.
DBA Name: HughesNet
FRN: 0012369286
Provider Type: Satellite
Provider Data Format: N/A
Date of First Submission: 10/1/2012
Date of Last Submission: 10/1/2012
Transmission Technology Types: 60
Percentage of Unmatched Addresses: N/A
Map Feature Record Count:
Wireless Polygons: 1

VSAT Systems, LLC.
DBA Name: Skycasters
FRN: 0018756155
Provider Type: Satellite
Provider Data Format: N/A
Date of First Submission: 10/1/2012
Date of Last Submission: 10/1/2012
Transmission Technology Types: 60
Percentage of Unmatched Addresses: N/A
Map Feature Record Count:
Wireless Polygons: 1

Mid-Atlantic Broadband Cooperative
DBA Name: MBC
FRN: 0019765304
Provider Type: Wireline
Provider Data Format:
Date of First Submission: 6/14/2010
Date of Last Submission: 4/1/2012
Transmission Technology Types: 50
Percentage of Unmatched Addresses
Map Feature Record Count
Middle Mile: 22

Processing QC, Batch Calculation, & Loading

While some provider data imported directly, where information for 2010 census geography was needed (Census Blocks, Middle Mile, Address Points) the feature of

interest was imported and processed differently depending on the type of geography stored. Not all providers submitted census blocks to the NTIA but those who did were validated with a field in the selection set census block layer which contained square mileage calculated on the VA Custom Lambert projection.

For data reported as service addresses, several fields were required that could be calculated in batch. The FULLFIPSID was calculated to the address points by spatially joining points to the census blocks. Latitude and Longitude were calculated in ArcCatalog using the calculate geometry function.

Only a few broadband providers who participated in the spring 2013 NTIA submittal provided Middle mile data. Resultantly, the processing and aggregation of a middle mile data set was done outside of standard broadband provider data processing.

Address Points, Road Centerlines, Census blocks, and Wireless Service polygons were processed as broadband provider data was received although middle mile information was a post processing step. To create middle mile event data, the broadband providers that provided the information to CIT and VGIN generally included latitude and longitude of the facility and these values were used in ArcGIS with the add XY function. After points were brought into ArcGIS, data was exported into a separate feature class and values were calculated based on information the broadband provider provided.

Post Processing Validation and Quality Control

The data included in the NTIA SBDD data model was quality controlled using the topology included in the model as well as the python script provided by NTIA. The topology was validated using ESRI ArcGIS Topology validation tools within ArcCatalog and no errors were reported.

The spring 2012 SBDD data submission was also quality controlled using the latest python script made available by NTIA on March 23, 2012. The script produced both warnings and failures and the data was scrubbed to correct as many as possible. A few items were noted and skipped due to inconsistencies in the NTIA GP check model as described in the March 23, 2012 conference call for all SBDD states with NTIA. The final run of the script resulted in speed tier warnings and failures which have been documented in detail in the READ ME_NTIA_SPRING_2012_SCRIPT_ERROS included in the data submittal.

US Virgin Islands Broadband Mapping Project

Product Release White Paper

Contact Name Manager:	Kevin Hughes
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Product Specification:	Spring 2013 NTIA Data Model
Product/Process:	NTIA—April 1, 2013 Data Deliverable
Dataset Submission QC:	NTIA—SBDD_CheckSubmission.py

Table of Contents

OVERVIEW

This white paper highlights the **Submission Summary** for this deliverable, as well as describes the **Data Gathering**, **Data Integration**, **Data Validation and Verification** and **Quality Control** processes used to create the Broadband Mapping Project's April 1st, 2013 data submission. To support varying levels of technical and program knowledge, both a **high-level summary** and a **detailed process review** are supplied.

SUBMISSION SUMMARY

PROVIDER DETAILS

PROVIDER PARTICIPATION

- Provider Participation Statistics Summary

Summary	Count
Total Providers Researched/Contacted	12
Total Valid Broadband Providers	9
Business-only/New Researching Providers	0
Non-Responsive Providers	0
Non-Cooperative Providers	0
Number of Providers – Represented in Data Submission	9
Number of Providers - Supplied Updates for this Submission	6
Number of Providers - Confirmed No Updates	3

- New Providers Since Last Data Submission
  - ADM Wireless

- Existing Providers – No Updates
  - Choice Communications
  - Sprint
  - Starband Communications

- Providers Included
  - AT&T Mobility
  - Broadband VI
  - Choice Communications
  - HughesNet (DirectWay)
  - SmartNet
  - Sprint
  - Starband Communications Inc/Spacenet
  - Innovative PowerNet
    - Including Innovative's Wireless Coverage.

- Non-Responsive Providers
  - None

- Non-Cooperative Providers
  - None

SERVICE OVERVIEW

- For this data submission a service overview has not been included. We are continuing to work closely with the service providers to update their average weighted nominal speeds (AWNS) to ensure a comprehensive Service Overview layer in the next data submission.

COMMUNITY ANCHOR INSTITUTION (CAI) DETIALS

OVERALL STATISTICS

Community Anchor Institution - Categories	Overall Count	CAIID Counts	Transmission Technology	Advertised Speed Down	Advertised Speed Up
Category 1 - School K through 12	82	36	35	36	36
Category 2 - Library	5	5	5	5	5
Category 3 - Medical/Healthcare	19	0	1	1	1
Category 4 - Public Safety	42	0	4	4	4
Category 5 - Universities/Colleges	4	2	3	3	3
Category 6 - Other: Government	122	0	27	26	26
Category 7 - Other: Non-Government	37	0	0	0	0
Total	**313**	**43**	**75**	**75**	**75**

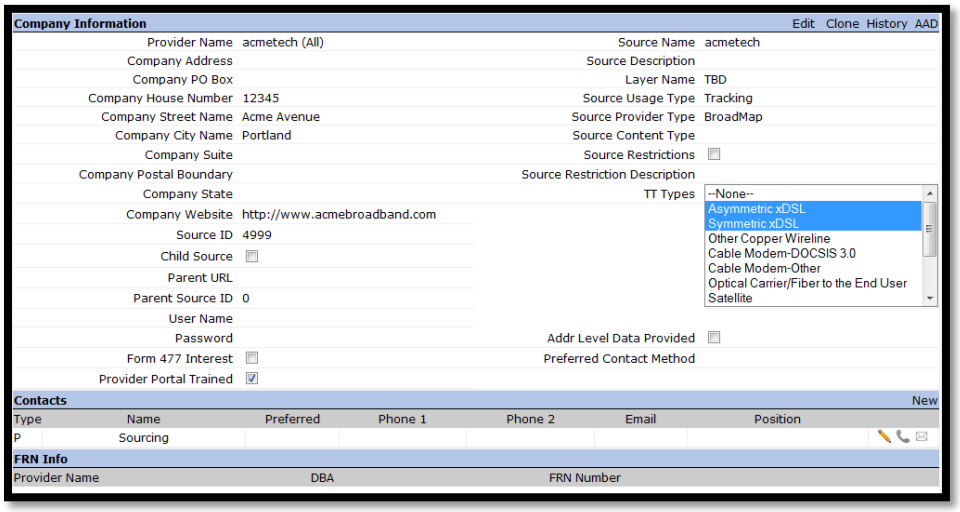
HIGH-LEVEL SUMMARY

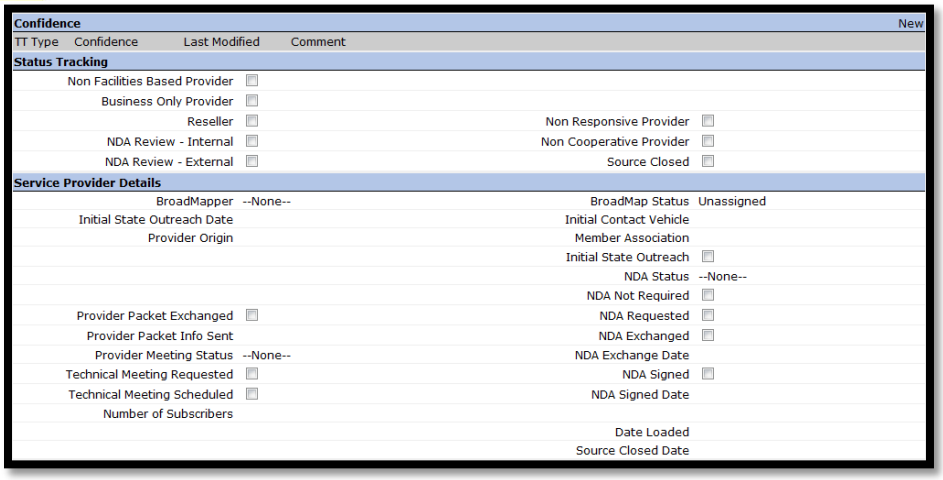
DATA GATHERING

BROADBAND SERVICE AREAS, MIDDLE MILE AGGREGATION POINTS AND BROADBAND SERVICE OVERVIEW

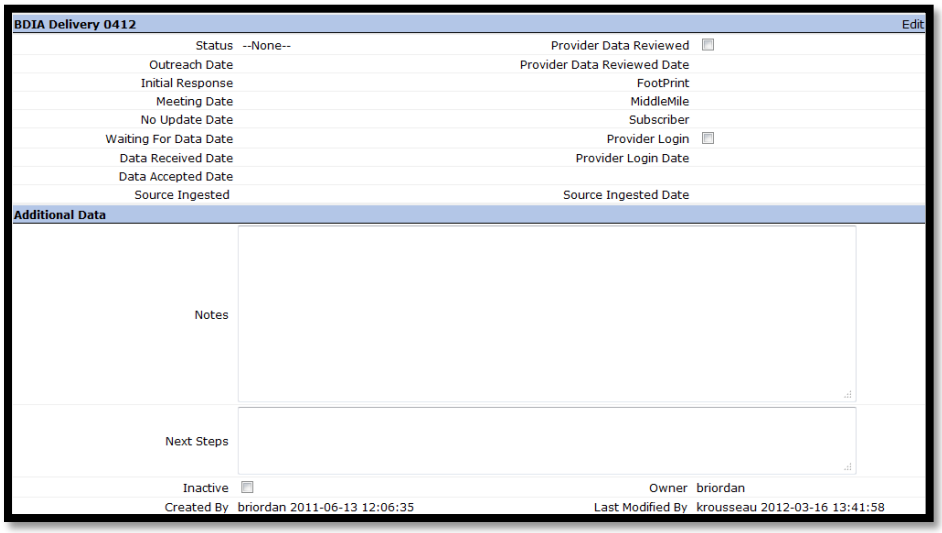
The collection of Broadband Service Areas, Middle Mile Aggregation Points and Broadband Service Overview information is handled through the following Provider Outreach Process:

- Build and maintain an inventory of Broadband providers through currently known providers and research.
- The inventory and everyday interaction with providers is tracked using the Provider Catalog (PCat). Below are some examples of the web application, which has a shared access between our team and mapping partner (BroadMap).





Confidence				New
TT Type	Confidence	Last Modified	Comment	
Status Tracking				
Non Facilities Based Provider	☐			
Business Only Provider	☐			
Reseller	☐		Non Responsive Provider	☐
NDA Review - Internal	☐		Non Cooperative Provider	☐
NDA Review - External	☐		Source Closed	☐
Service Provider Details				
BroadMapper	--None--		BroadMap Status	Unassigned
Initial State Outreach Date			Initial Contact Vehicle	
Provider Origin			Member Association	
			Initial State Outreach	☐
			NDA Status	--None--
			NDA Not Required	☐
Provider Packet Exchanged	☐		NDA Requested	☐
Provider Packet Info Sent			NDA Exchanged	☐
Provider Meeting Status	--None--		NDA Exchange Date	
Technical Meeting Requested	☐		NDA Signed	☐
Technical Meeting Scheduled	☐		NDA Signed Date	
Number of Subscribers				
			Date Loaded	
			Source Closed Date	



BDIA Delivery 0412				Edit
Status	--None--		Provider Data Reviewed	☐
Outreach Date			Provider Data Reviewed Date	
Initial Response			FootPrint	
Meeting Date			MiddleMile	
No Update Date			Subscriber	
Waiting For Data Date			Provider Login	☐
Data Received Date			Provider Login Date	
Data Accepted Date				
Source Ingested			Source Ingested Date	
Additional Data				
Notes				
Next Steps				
Inactive	☐		Owner	briordan
Created By	briordan 2011-06-13 12:06:35		Last Modified By	krousseau 2012-03-16 13:41:58

- Update provider material that describes the data requirements and logistics for data transfer.
- Update Non-Disclosure Agreement (NDA) for use in the project, where applicable.
- Maintain multiple protocols for the provider to submit data, including Secure File Transfer Protocol (SFTP) technology when desired.
- Conduct one-on-one informational discussions with each provider to communicate the following:
    - Requirements of this project;
    - Broadband data required to support the product data model;
    - Submission protocols available;
    - Capability to validate how the supplied data is aggregated.
- Download/receive provider data.
- Establish a repeatable process with provider. Maintain provider communication, transaction and data handling records throughout the project (dates contacted, data received, etc.).

COMMUNITY ANCHOR INSTITUTION (CAI)

The collection of CAI information is handled through the following CAI Collection Process:

- Collect and maintain inventory of CAIs through currently known CAIs, data mining, and research.
- Maintain web-based CAI portal for institutions to add or confirm attribution, location and enter broadband-specific information.
- Upload web-based data to Core Database for standardization.
- Perform internal cleansing, such as removing duplicate records, identifying gaps in broadband attribution and verifying category.
- Geocode CAI locations.
- Translate Core Database data to deliverable-ready format.
- Continue engagement with non-responsive institutions.

DATA INTEGRATION PROCESS

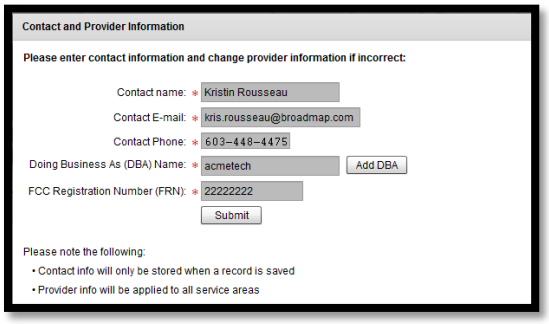
The data integration and processing mechanisms currently used allows for multiple types of inputs and result in a standardized output that meets the NTIA deliverable requirements. This flexible process supports data model changes and project-requested enhancements.

- Receive inputs from providers via submission protocols; upload into Sourcing Database and catalog with provider information.
- Review provider-supplied data for completeness and for potential discrepancies that require resolution prior to processing and flag as necessary.
- Categorize input into data-type category (addresses, block lists, paper maps, etc.).
- Standardize input based on data type within Staging Database.
- Create Compact Polygons (CP)—(internal methodology for generating area-based feature for coverage in Staging Database).
- Apply broadband attribution to CP; apply metadata to CP.
- Perform quality analysis of the CP against the source supplied to identify any completeness or accuracy issues.
- Request additional information from the provider if elements of coverage are missing or contain discrepancies. This is a second manual quality check to ensure data is complete.
    - Process coverage area to build the required NTIA data model layers.

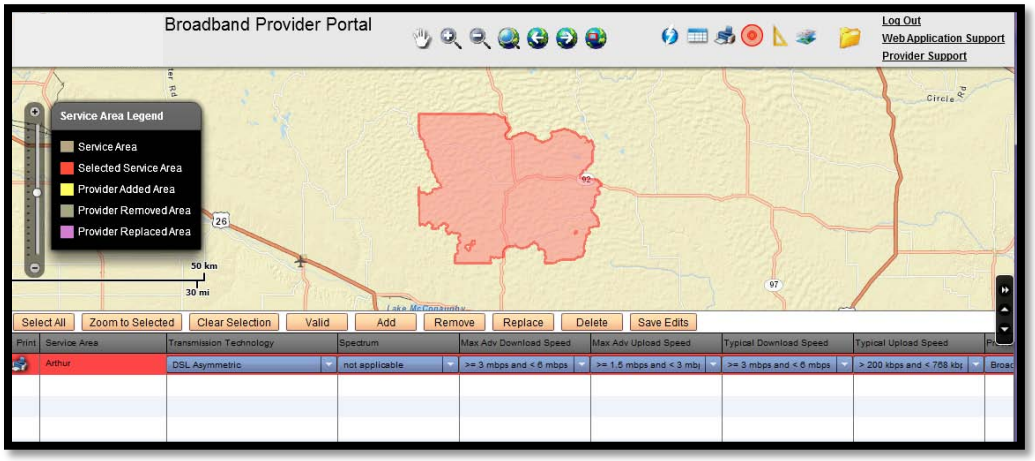
With the deployment of the Provider Portal this round, the data collection and later validation process was streamlined allowing both activities to occur within a secure web application. The majority of the providers used this methodology as it supplies them with more visibility into how their data is being represented and gives them knowledge and ownership of their coverage representation. Below are some bullet points and supporting screen shots on how the portal is used.

- Each provider is assigned credentials with a strong password to ensure security measures are taken into consideration

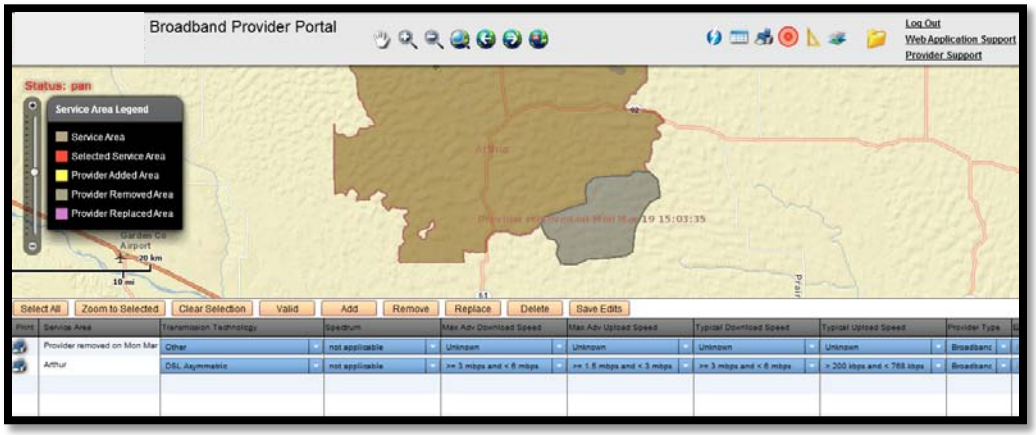
- Collection and confirmation our contact, as well as the company's DBA Name and FRN accuracy



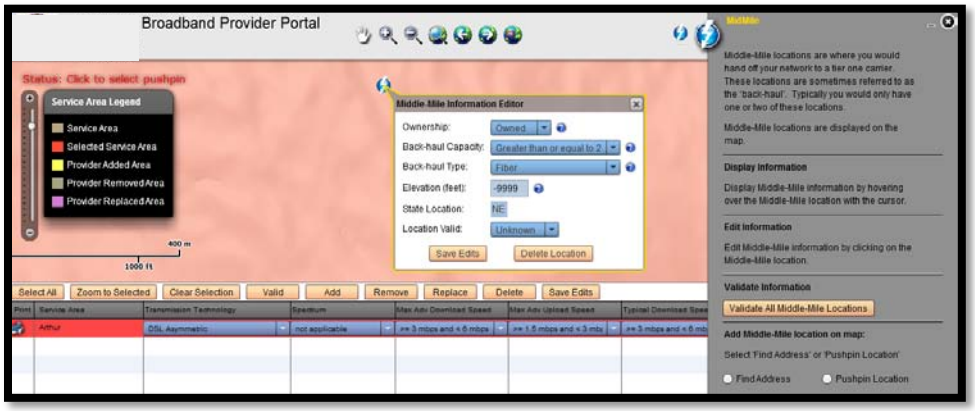
- Capability to review and request changes to the coverage footprint

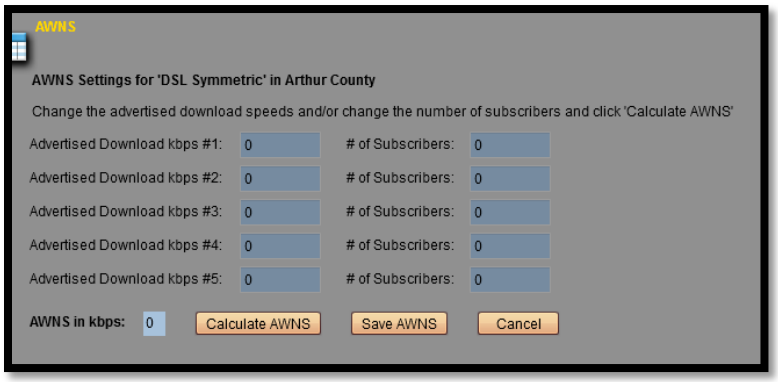


  - The provider can Add/Remove portions, or all, of the footprint requesting that their footprint be increased or refined.

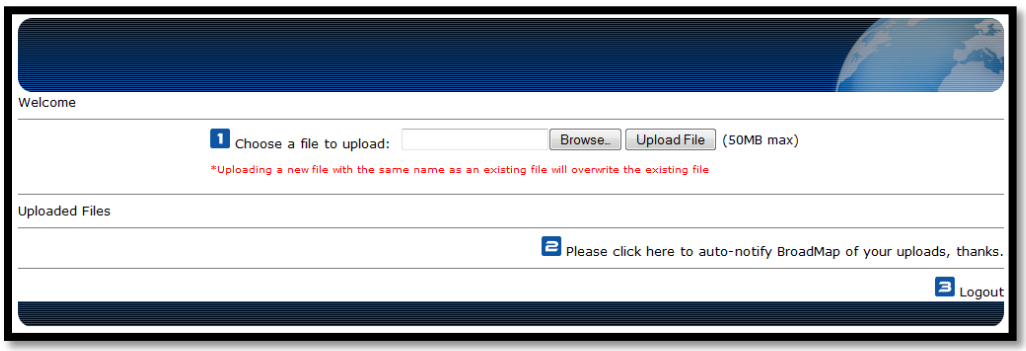


- Middle Mile and Average Weight Nominal Speed (AWNS) collection and validation





- File upload functionality to support providers that would prefer a shapefile, spreadsheet, PDF, KMZ/KML file be used to reflect changes for the data round



- Once the provider has review completed changes to their coverage, middle mile and AWNS, then can validate them all by signing off that everything is accurate.

DATA VALIDATION AND VERIFICATION

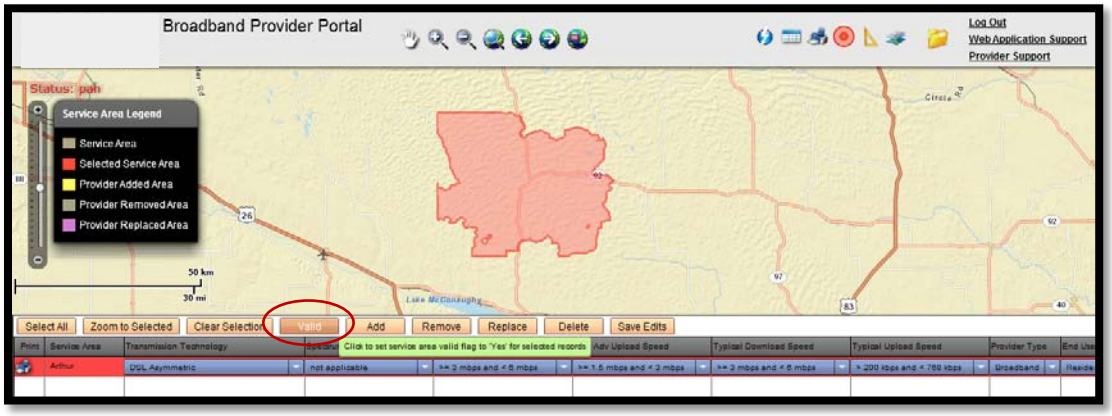
Following the creation of the product, process steps within Data Validation and Verification occur. To ensure the data collected and processed is as accurate and comprehensive as possible, provider validation and internal verification activities are employed. After the initial mapping of providers' coverage areas and serviceability claims, additional reviews are performed using the methods described in the subsections below in order of action (**Broadband Provider Validation**, **SME Verification, Public Verification, Third-Party Data Verification and Confidence Values**).

BROADBAND PROVIDER VALIDATION—PROVIDER PORTAL APPLICATION

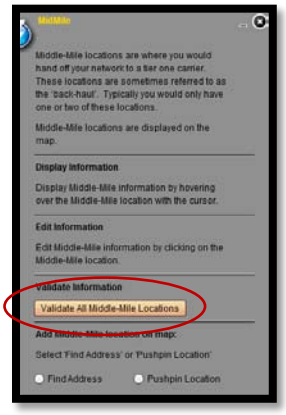
Providers are trained on and requested to use a secure interactive web application to review their current coverage area(s) and supporting broadband attribution and validate their data or submit change requests to update their data. All provider change requests go through the **Data Integration Process** and are reviewed with the provider to complete validation.

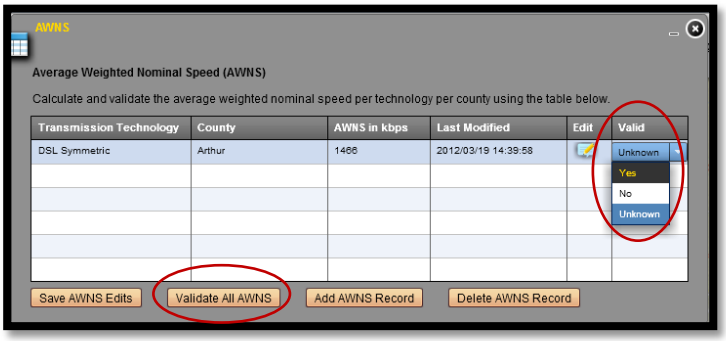
With the latest released of the Provider Portal, validation on the coverage area, middle mile and average could be completed individually. Validation examples are as follows:

- Coverage validation can be done on one record/footprint at a time or by selecting footprints and selecting the 'Valid' button. The provider could also print off or download their coverage for their own tracking purposes.



- Middle Mile & AWNS Validation





All validation results are tracked internally through our Validation Table, which also improves the overall **Confidence Value** as mentioned below.

CROWD SOURCING

The broadband interactive map has been released to the public, which includes functionality to collect feedback on the provider's coverage areas, as well as running a speed test. The feedback and speed results have been collected and reviewed prior to our outreach for this data submission. All discrepancies were reviewed with the providers to identify if any map refinement is required.

The public website can be viewed at the following hyperlink:

https://usvi.broadmap.com/PublicMap/

THIRD-PARTY DATA VERIFICATION

Since this was the first data submission to NTIA from the new vendor, focus continued to be placed on implementing an improved process methodology and integrating provider's coverage areas into a new internal model. This included ensuring all providers had fully executed NDAs and a chance to validate their data prior to submission.

We also review this data submission against the previous data submission to ensure all changes were expected and within the NTIA data model requirements.

We are currently in the process of reviewing 3rd party data to extend our verification efforts.

CONFIDENCE VALUES

All verification, validation and manual quality review results are tracked by provider/technology type and stored and maintained within a **Validation table**. A confidence value is assigned, based on internal assessments of the collected information, to highlight the provider coverage areas and/or attributions that would benefit from further investigation and/or enhancements.

With the continued efforts on provider validation, 3rd party verification and the release of the public interactive map with feedback collection functionality, the confidence values will be utilized further to identify specific areas in need of attention. We're currently at the initial stages of this initiative, but will have a more complete picture in time for the subsequent data submissions, as we will use the lower values to identify areas where further testing or provider interaction is required.

QUALITY CONTROL

Following collection, processing and analysis of the provider and CAI data, the product is checked manually and algorithmically against the NTIA data model. Some of the items included within these checks are:

- Format correctness;
- Table and field structure;
- Valid values, including default values, where applicable;
- Geographic extent and topology errors.

Prior to data submission, another quality control script supplied by NTIA is run. This script, SBDD_CheckSubmission.py, creates an output in text form that is required to be submitted along with the final deliverable. All errors must come up clean, unless otherwise specified by NTIA.

DETAILED PROCESS REVIEW

To review the detailed process, please review the attached object:

BMap_ProcessDetails_2013_04_01.docx

Project History: Vermont's Broadband Mapping Initiative (BMI) is a collaborative broadband data collection and verification effort involving partners from the public, private and academic sectors participating as the Vermont Broadband Mapping Team. The BMI is supported by grant funds provided under the National Telecommunications and Information Administration's (NTIA) State Broadband Data and Development Program (SBDD).

In November 2009 the Vermont Broadband Mapping Team (BMT) initiated the creation and development of a comprehensive and verified geographic inventory of broadband service availability in the State of Vermont. Landline and wireless services (fixed and mobile) were mapped using information from the providers and other sources. The broadband mapping information collected and verified through this effort is supporting the broadband development objectives identified in the RUS Broadband Initiatives Program (BIP) and NTIA's Broadband Technology Opportunities Program (BTOP) in Vermont. Most importantly, the geographic inventory will further refine our understanding of the location of "unserved" and "underserved" areas in the state, thereby supporting targeted future investments in these areas.

The BMT includes the following organizations: Vermont Department of Public Service, the Vermont Telecommunications Authority, the Center for Rural Studies at the University of Vermont, Vermont's Enhanced 9-1-1 Board and the Vermont Center for Geographic Information. The BMT is also supported by private sector contractors.

Summary of Deliverables: The BMT's broadband data submission (April 1st, 2013) includes broadband information as of 12/31/2012 (VT_SBDD_20130401.ZIP). The data complies with the NTIA NOFA requirements and SBDD data model (FGDB) specifications as of 12/31/2012. A detailed description of each dataset is available in the ./metadata folder included with the deliverable package.

Listed of Providers Contacted: The BMT reached out to the following list of providers for this update.

List of all Companies Contacted by BMT		
Doing Business As	**FCC FRN**	**Provided Data?**
AT&T Mobility	0004979233	Yes
Burlington Telecom	0010480093	No Updates
Charter Communications Inc.	0017179383	Yes
Cloud Alliance	0018600445	No Updates
Comcast	0003768165	Yes
Duncan Cable	0016391716	No Response
EC Fiber	9999	Yes
FairPoint Communications	0003723202	Yes
FairPoint Vermont	0017551359	No Updates
Franklin Telephone Company, Inc.	0004356952	No Updates

List of all Companies Contacted by BMT		
Doing Business As	**FCC FRN**	**Provided Data?**
GlobalNet	0018331173	No Response
Great Auk Wireless, LLC	0017383332	No Updates
Green Mountain Access	0004956652	Yes
Hughes Network Systems LLC	0018483073	No Response
Kingdom Connection	0017631540	No Response
Level 3 Communications	0003723822	Yes
North Branch Networks	0018206391	Yes
North Country Communications	0019521087	No Response
SegTel	0006204630	No Response
Shoreham Telephone Company	0004380200	Yes
Skycasters	0018756155	Yes
Smuggler's Notch Water Company	0007320963	No Updates
Southern Vermont Broadband Cooperative	9999	No Response
Southern Vermont Cable Company	0003770351	No Updates
Sovernet Communications	0015120850	No Updates
Sprint Nextel	0003774593	No Response
Starband	0005087457	No Response
Stowe Cablevision	0003755766	No Updates
TDS Telecom	0004948105	Yes
TelJet	0017834540	No Updates
Topsham Communications	0016569485	No Response
Topsham Telephone Company	0016569485	No Response
Trans-Video Cable	0003770401	No Updates
U.S. Cellular	0004372322	No Updates
Verizon Wireless	0003290673	Yes
Vermont Telephone Company	0003646213	No Updates
WaveComm	0003665080	No Response
WildBlue Communications	0007843766	No Response
WirelessVT Solutions	9999	No Updates

Data Development Methodology: A variety of data source and data collection methods were used to identify the characteristics and geographic extent of broadband service in Vermont. Here is a quick breakdown

- **Cable:** Mapped to street/street-segment level

- **DSL:** Mapped as polygons (usually Exchange areas) or address points (list of addresses submitted by provider).
- **Fiber Optic:** Mapped as address points (list of address submitted by provider)
- **Fixed Wireless (WISP):** Mapped as polygons (propagation maps prepared by independent contractor using data provided by WISPs)
- **Mobile Wireless:** Mapped as polygons (data submitted by provider)
- **Satellite:** Mapped as polygons (data submitted by provider). Providers of satellite-based broadband services claimed that they covered the entire state.

The cable, DSL, fiber optic, and fixed wireless (WISP) layers were "intersected" with Vermont's E911 address point layer to determine broadband availability at the address-level. This information was then intersected with Vermont's 2010 Census Block layer to calculate availability at the block level. This deliverable includes Census block-level data for Census Blocks less than or equal to 2 sq miles, and address level data for Census blocks greater than 2 sq miles.

Mobile wireless and satellite-based broadband polygons were submitted by providers to VCGI. They were formatted to match NTIA specification, but otherwise forwarded as-is.

Vermont's broadband providers submitted data which was used to populate a table listing maximum advertised and typical speeds by Metropolitan Statistical & Rural Service Areas (Cellular Market Areas). This information was used to populate the speed information contained in the submitted broadband, including speed information at the census block level. In numerous cases providers did not submit typical speed information.

The initial list of Community Anchor Institutions (CAIs) was derived from existing data sources including the VT Critical Facilities Database and Public Libraries Survey from the Institute of Museum and Library Services. Community Anchor Institutions include schools, libraries, medical facilities, public safety facilities, universities and colleges, and other community facilities such as town halls/offices. An email and hard-copy mailing was sent to every institution in the list. They were asked to fill out an online survey. Follow-up emails and phone calls were made to increase the response rate. The data delivered to the NTIA includes all CAIs, but only includes broadband information for a subset. Additional broadband institutions will be added as their information becomes available.

Data Review: No formal confidence interval for provider data submissions has been established. Vermont is waiting for clarification from the NTIA on this. However, each provider submitted dataset is evaluated against a minimum standard or expectation of quality. If the data submission is identified by the VT Dept of Public Service as not credible based upon their experience, it is not included in the inventory. If a provider creates a data submission that cannot be parsed or, resolved, we contact the provider to try and work out a method of submission that can be used. Vermont had 64% participation (responded with data updates or that no updates in service area exist) from all 39 broadband providers for this data submission. However, many of these did not have any updates to report.

Feedback Loops: Each broadband provider that supplies broadband service data in some manner to the VT broadband data inventory is given the option to view a final version of their data submission as it will be represented in the NTIA delivery. However, very few providers have asked for a copy of the final version of their data submission for review. Some smaller providers have asked for, and received, a hardcopy map or digital map graphic (PDF) of their coverage area. All of the providers that requested to see what was being submitted to NTIA representing their coverage area received either a copy of the data, a hardcopy map or digital map graphic in accordance with their preference.

Data Verification Methodology: The BMT used two primary data verification methods: 1) a phone survey conducted by the UVM Center for Rural Studies (CRS) to verify the broadband maps, and 2) wireless-drive testing to evaluate mobile wireless propagation maps submitted by providers.

Conclusion: Vermont's Broadband Mapping Team is pleased to deliver a robust broadband availability inventory to the NTIA. We are confident that it meets the specifications outlined in the NTIA SBDD NOFA. The broadband data and maps will help Vermonters refine their understanding of "un-served" and "underserved" areas of the state, thereby supporting targeted future investments in these areas.

Washington Broadband Mapping

Data Submission Methodology Report

April 1, 2013

1935 Jamboree Drive
Colorado Springs CO
80920

Department of Commerce
Innovation is in our nature.

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PO Box 42525
Olympia, WA 98504-2525

Washington Broadband Mapping

Data Submission Report (April 1, 2013)

Table of Contents

1 Introduction

This report is submitted along with the seventh data submission for the Washington Broadband Mapping Project. This submission includes all data collected to date per the requirements of the National Telecommunications and Information Administration (NTIA) State Broadband Data and Development Grant Program (Docket No. 0660-ZA29) Notice of Funds Availability (NOFA) and formal and informal clarifications to it. Specifically, it includes broadband data collected from broadband providers and community anchor institutions data compiled from various sources for the State of WA. The State of WA has retained a mapping contractor, The Sanborn Map Company, to perform the work related to the Mapping Grant for this project. Data from the previous submission is now publicly accessible via the WA Broadband Program (http://wabroadbandmapping.org/).

This document is a supplement to the six previous reports submitted with previous data submissions on May 1, 2010, October 1, 2010, April 1, 2011, October 1, 2011, April 1, 2012 and October 1, 2013 respectively. Therefore, it builds on the documents provided with those submissions. Rather than repeat the contents of the previous report, this document makes incremental updates on various topics where changes have been made in the methodology or reiterates the methodology used. Please refer to the previous documents for further details.

2 Overall Project Status

2.1 DATA COLLECTION

This section details data collection related to NTIA deliverables which include broadband data and community anchor institution data.

2.1.1 Broadband Data

For this submission, Sanborn started data collection efforts on January 3rd, 2013 by sending out data update requests and technical data specifications. These were sent to a large list of companies which were compiled from multiple lists (FCC 477 list (June 30, 2011), a list provided by the Washington UTC, Wireless Internet Service Providers Association (WISPA)) and from any providers that were identified through other sources such as web research, planning meetings, State outreach, etc. Sanborn also uploaded the final data for each provider in NTIA format from the previous submission on the Sanborn Provider Portal. The providers were encouraged to use the provider portal and update their information on it.

We followed the same contact and follow-up protocols as the previous submissions. In brief, this involved following up with already participating providers after sending them a letter requesting data updates. For newly identified providers, we contacted them three additional times and offered any/all support to make this as easy as possible. We provided a due date for submission but worked with providers who needed more time. If participating providers did not submit updated data and did not respond to our efforts to contact them, we reused their existing data.

The following are some of the important changes or no changes:

1. We continued to request all providers to provide us their speed information in mbps rather than as a speed tier. We did this in order to better validate the data, analyze served/underserved, and identify the breakdowns in speeds within a given tier. However, we have found over the last few submissions, this has caused some confusion between what we are asking for (speeds in mbps) vs. typical speeds. Given that many providers are not providing this information, it is hard to use the data effectively for analysis and we may consider going back to the NTIA requirements in the next submission.

2. As in the previous submission, we also requested fixed wireless providers to provide us appropriate information to do propagation analysis. We helped improve data for 1 provider this submission, added 5 new wireless providers and sourced data for them from various sources such as Link Technologies. For those WISP providers that provided us the data to accomplish propagation, we used Radio Mobile to do propagation

analysis and iterated with the providers until the parameters were suitably selected to produce the appropriate output. Propagation analysis results were provided to the providers for review through our provider portal and Google kmz file formats to ensure validation.

3. We continue to not include resellers in the submission.

4. Due to our NDA restrictions, last mile infrastructure points, if submitted by providers, are not being submitted to NTIA. Likewise, address points are not included in this submission for any commercial provider.

5. We continue to submit data for satellites in this submission based on NTIA clarifications. In this submission, Hughes Net submitted an entirely new set of data during the validation stage. The data mapped out census blocks served by two different satellites, but there was no confirmation provided by Hughes about what to do with the gaps left over. We are submitting the data as is.

6. If a cable based wireline provider provides both DOCSIS 2.0 and DOCSIS 3.0 service to the same area, the block or road was listed only once with a technology code of 40.

7. Providers were only willing to indicate on a general level if they served business, residential or both - we did not get any providers that broke down the type of service by blocks or road segments. If the provider stated they only serve business to business customers we fill in the "category of end user" with code 2, or if they told us specifically that they serve only residential, we used code 1. Those that did not confirm their end user codes, we calculated as a 5 unless we know from other sources that they needed to be something else. There are six providers in WA who are identified as serving business customers only. These are:

    1) Cogent Communications, Inc.
    2) Capacity Provisioning, Inc.
    3) Integra Telecom of WA
    4) Level 3 Communications, LLC
    5) LightSpeed Networks, Inc.
    6) Orcas Power & Light Cooperative
    7) TW Telecom of Washington LLC
    8) XO Communications, LLC

8. This submission is being made based on the NTIA data model as of December 2012 provided by NTIA on the SBDD site.

9. Terrestrial Mobile Wireless and Terrestrial Fixed Wireless (licensed and unlicensed) were again treated as wireless coverage and were delivered as a shape. In cases where a provider served the same spectrum with different speeds, overlapping areas were removed and the higher speed was assigned. The exception to this rule is where a provider is using the

same spectrum, but delivering different underlying technologies such as 3G, 4G, or 4G LTE. In this case a continuous polygon is being created that represents the area that is offered for both 3G and 4G even if these polygons overlap.

10. **In this submission, for landline broadband, we removed blocks and roads that are in water-only census blocks. We communicated this to providers at the beginning of data collection to make sure they would let us know if they really served on blocks that were water only and no population (i.e. situations of docks or houseboats or other unforeseen situations).**
11. Where providers told us to reuse data from previous submission or did not respond to our data request, we are resubmitting data that were submitted in S6. Because of the removal of water we have some differences in counts for roads and blocks even when no data updates were submitted by a provider.
12. In the final stages of processing this submission we noticed that some providers are delivering street segments that appear to be new roads that have been constructed since the 2010 data was created, but they are not in the official Census 2010 geometry data. These roads were dropped from the submission, but we are going to look into a process to add these roads to the next submission if they can be verified as accurate. **Some guidance on this from NTIA may be useful so all states are doing this consistently.**
13. In this submission, we also found that some providers were using street segments that collapsed multiple census streets into a single segment. We have used manual processes to select roads in the census data for such providers.

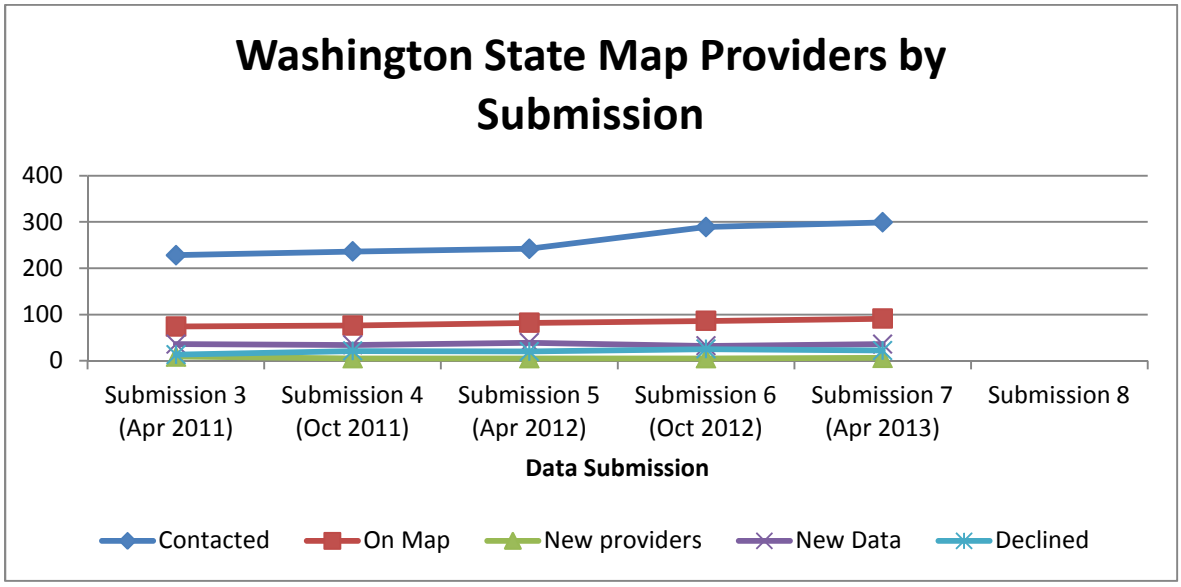
    We have added the following new providers in this submission:

    1) Ptera Wireless Inc. (fixed wireless)
    2) LS Networks (Lightspeed Networks) (wireline but business only service)
    3) Spectrum Online Services (fixed wireless)
    4) Inland Cellular (wireless)
    5) TV Association of Republic (wireline) – service area derived from local knowledge and web research
    6) Kitsap PUD (wireless) – Municipal WIFI service area derived from knowledge of towers and speed tests conducted by WA State Broadband Office.

    In this submission:

1) We have contacted a total of 299 providers in WA of which 9 providers were contacted for the first time.
2) We have identified 113 potential providers, of which 91 are participating in this map to date and 22 have refused to participate. In addition, 24 providers have not responded to our efforts to contact them and we are not sure whether any of these providers are actual providers or not. A list of the non-responders, resellers and non-providers is provided at the end of the document and all of these potential broadband providers were contacted. Even if some providers were identified as non-providers or resellers in previous submissions, we continue sending out data request letters to these providers in case their status has changed in any way.
3) Approximately 40% of the providers submitted new or updated data whereas for the remaining providers we reused data from their previous submissions. This is in contrast to 37% of providers submitting new or updated data during the previous submission.
4) In this submission, based on guidance from NTIA, we have estimated service areas for two providers where we were able to based on local knowledge and web research – these were TV Association of Republic and Kitsap PUD. In the latter case, the full extent of the area is not captured – only where local knowledge provided valid coverage area, these areas were included in this submission.

The following chart shows the level of participation in the various submission in the last two years.



During this submission period, we had the following changes in providers:

1) Broadstripe was bought by Wave Division Holdings. The data from the two are merged now under Wave Division.
2) Black Rock Cable was also bought by Wave Division Holdings. Most of the assets for Black Rock Cable were dark fiber and the Wave Division contact was not aware of the data at this time.
3) Covad Communications is now Megapath Corporation

2.1.2 Community Anchor Institutions Data

The community anchor institutions data continues to be crowd-sourced through the online data gathering application created by the Sanborn Team.

2.2 DATA PROCESSING

We started with the following base data:

Census Blocks:

For this submission, Census 2010 data was utilized. The data was set up as follows:

- Block size (AREA) is calculated combining the 2010 land area (ALAND) and water area (AWATER)
- AREA is converted from square meters to square miles to calculate square mileage (SMI).
- If the SMI of a block is less than or equal to 2, then the less than or equal to 2 square mile indicator (LE2SMI) is set to true.

Road Segments:

2010 Tiger Line IDs (TLID) were used for data processing for this submission. The data was set up as follows:

- The GT2SMI (Greater Than 2 Square Mile) indicator is set to True when:
  - The 2010 road segment is completely within a block that is NOT less than 2 square miles
- Only minimum and maximum address ranges and a single zip code for each road segment are maintained.

All data received went through the following processing steps:

1. **Triage:** All new data were quickly reviewed to understand what was received, and in what format. We also made sure we had all the required components for NTIA's data model, such as their FRN and advertised speed information. We also screened for any known issues that we might have seen before (such as Excel 2003 spreadsheets that cut off at 32k row).
2. **Ingest:** At this time the data are actually brought into our systems. Each provider is set up with a unique file geodatabase to store their information. Record counts of what was received are logged so that we can validate that we did not drop anything in processing.
3. **Data Processing:** In this step, the data goes through a number of ETL routines to convert the raw proprietary information into a format similar to the NTIA format. The exact routine utilized depends on how the data are received.

1) When a wireline provider submits a service boundary, we select all the blocks and roads inside that shape.
2) If a wireline provider submits a customer address list, the points are geocoded, and then the appropriate block or road segment is selected.
3) If a wireline provider submits block and road information using Census data, we make sure everything is formatted to the appropriate specifications.
4) If the wireline provider submits any type of road or line data that do not directly correlate to the TIGER data set, we convert the lines to TIGER by selecting the road centroid and spatially selecting the closest segment in our data set. If the road is in a block less than 2 square miles, then the block is selected. Some manual cleanup is also applied to make sure we do not accidentally drop any road segments that should have been processed.
5) Wireless provider data are formatted to ensure that there are no overlapping polygons with the technology type and spectrum. In addition the data are cropped to the state boundary.
6) After each round of processing, we make sure that we only keep unique records. A unique record is defined as having a unique combination of FRN, Block/Road ID, and technology type. If there are multiple records with different speeds, but all else is equal, than we select the maximum of the advertised speeds.

4. **QC Review:** All data are then sent to a different analyst to perform a thorough quality control review on the processed data set. Record counts are compared to original submitted data. The QC staff also make sure the ETL scripts and routines populated all of the right fields.
5. **QA Review:** Data are then sent to another team for Quality Assurance Review. In this step the data are not only double checked against what was originally submitted, but it is also brought up inside standardized ArcMap templates that allow us to make sure our results make sense. This often involves comparing the new data set with prior submissions, as well as looking for any possible technology or speed anomalies and verifying against third-party datasets (as discussed in more details in the next section).
6. **Provider Review:** Processed data are all posted to a customized web-mapping tool we commonly refer to as the Provider Portal. All providers are notified once their data are available on the site, and most are given five business days (with the exception of a couple who were provided three business days) to review the data and respond. In this site, providers can log on and visually see their processed data in a map

format. It also allows them to overlay their raw data to help them validate that we did indeed process things correctly. The provider portal also has a suite of markup tools that will allow the providers to edit their data, including adding or removing service areas, and making changes to the data attributes.

7. **Comment Processing:** All comments and feedback received from the provider portal are then reviewed and applied to the processed data set. This updated data set goes back through our QA and QC processes, and if time allows, back out to the Provider Portal, for the provider to review and sign off.

8. **Data Append:** After all of the individual data sets are processed and approved, we run an append process which merges all of the individual provider data sets into one geodatabase. This is also the point where our team will do any final transformations to get our working data model into the latest NTIA publishing format.

9. **Submission Comparison Check:** Starting with this submission, an additional check was added to our quality review process. An application was written that compares the individual provider's unique data that is stored in their unique file to that which is stored in our final appended file and the NTIA submission data. Any variation in each of these data files in thoroughly investigated and resolved. This was done to assure no data loss or data transformation issues. We also compare the submission 5 dataset to the submission 6 dataset, review any variations and assure that the changes found can be documented as being requested by the provider.

10. **Final QA/QC:** A series of quality checks are run on the final appended data sets to ensure it is ready for submission to NTIA. We also run the latest version of the NTIA receipt tool at this time. If any issues are flagged as failing they are reviewed and corrected. All warnings are also reviewed and either corrected or documented in the attached document which explains that we have validated this data and it should be accepted. Any last issues are corrected, and the data are sent to the state for their review.

11. **Submission to NTIA.**

2.3 DATA VALIDATION

Sanborn has continued to perform the same validation on the data as in the previous six submissions (details in previous reports and a summarized version

provided below). Some minor updates to the validation process are discussed below. We also publish our validation methodology online at http://wabroadbandmapping.org/MapValidation.aspx

1) QC of the data at various steps – this includes when data are received (triage), when they are processed through the various processing steps discussed above, etc.
2) Spatial checks against public and commercial datasets
    a. For WA, we continued to use the following datasets for validation:
        i. Exchange Boundaries: for DSL boundaries
        ii. MediaPrints: for Cable and Fiber boundaries
3) Speedtest data and other data collection for verification
    a. We continue to use speedtest data collected through our interactive map and community anchor data crowd-sourced for validation purposes.
    b. We also incorporated any feedback we received through the interactive map – this included feedback such as incorrect speeds, incorrect boundaries, missing provider or areas of no service, etc.
4) Verification by providers – processed data are uploaded on our Provider Portal for providers to review both the outcome of data processing and any issues that we found in the third-party and crowd-sourced validation. Issues pertaining to a particular provider are highlighted and shown in the portal for those providers only. Issues that are global and cannot be assigned to a particular provider are shown to all providers (e.g. there are no providers in this area, or we tried to get service here and heard x from A provider, y from B provider, etc.). Previously, we were highlighting these issues through a letter but in this submission, we have integrated the feedback through the Provided Portal. We make additional calls to providers who have issues. Planning workshops and local validation – we have looked into any issues that the State Planning team has identified and brought to our attention.
5) This submission, we also did a significant amount of data validation at the statewide level and used change maps to see if there were any significant aberrations in the data. The WA State Broadband Office helped in reviewing the data at the statewide aggregation.

2.4 Submission 7: NTIA Submission Data Model Schema Changes

The latest data model released was released in December 2012 and was very similar to the previous data model. No substantive changes were noted and changes related to allowable speed and technology of transmission combinations. Most of these combinations have exceptions to them and hence were not being completely disallowed by NTIA.

2.5 UNIVERSE OF CONTACTED PROVIDERS/NON-PROVIDERS

We have contacted a total of 299 providers in WA of which 9 providers were contacted for the first time.

We have identified 113 potential providers, of which 91 are participating in this map to date and 22 have refused to participate. In addition, 24 providers have not responded to our efforts to contact them and we are not sure whether any of these providers are actual providers or not. A list of the non-responders, resellers and non-providers is provided at the end of the document and all of these potential broadband providers were contacted. Even if some providers were identified as non-providers or resellers in previous submissions, we continue sending out data request letters to these providers in case their status has changed in any way.

2.5.1 Non-providers

Advanced Tel, Inc.
Aircado, Inc.
Americom Technologies, Inc.
Axcess Internet
Beaver Creek Telephone Company dba Timberline Tele
Bell South Long Distance, Inc.
Bellevue, City of
Big River Telephone Company, LLC
Bluebird Wireless Broadband Services, LLC
Cbeyond Communications, LLC
CCS, LLC
CIMCO Communications, Inc.
Clear Talk
Convergia, Inc.
Cordia Communications Corp.
CTC Communications Corp.
CTG3/Bandwidth Builders
DigitalBridge Communications Corp.
DONOBi
Eastern Sub-RSA Limited Partnership
Eltopia Communications, LLC

Enhanced Communications Network, Inc.
Enventis Telecom Inc.
Extenet Systems, Inc.
First Communications, LLC
Harbor Communications, LLC
Horizon Telecom, Inc.
IDT America, Corp
Infotelecom Holdings, LLC
Inland Long Distance Company
Matrix Telecom, Inc.
Maverick Wireless
McLeod USA Telecomm (PAETEC)
Navigator Telecommunications, LLC
Netlogic, Inc.
NextG Networks of California
North County Communications Corporation
North Olympic Penninsula Data Centers
Pac-West Telecomm, Inc.
Plexicomm, LLC
Public Communications Services, Inc.
PUD - Asotin
PUD - Clark
PUD - Cowlitz
PUD - Ferry
PUD - Jefferson
PUD - Kittitas
PUD - Klickitat
PUD - Mason #1
PUD - Skamania
PUD - Snohomish
PUD - Stevens
PUD - Thurston
PUD - Wahkiakum
PUD - Whatcom
Qnect
Queenanne.net
Sisna
Skyline Telecom
Smart Choice Communications, LLC
Stat Network Solutions
Syniverse Technologies, Inc.
T2 Technologies
Tcast Communications, Inc.
Telecom Pacific
Touchtone Communications, Inc.
TransNational Communications International, Inc.
University Corporation for Advanced Internet
Virtual Networking Services, Inc.
Voicecom Telecommunications, LLC

Wanned Technologies, Inc.
Washington RSA No 8 Limited Partnership
X2Comm, Inc.
YMAX Communications Corp.
Zayo Bandwidth Northwest, Inc.
Zayo Enterprise Networks

2.5.2 Resellers

Access One, Inc.
Access Point, Inc.
ACN Communication Services, Inc.
Airespring, Inc.
Alliance Group Services, Inc.
Amerion
Birch Communications
Blue Mountain Internet's HyperSpeed Internet
Broadcore, Inc.
Broadview Networks Holdings, Inc
BullsEye Telcom, Inc
Cincinnati Bell Any Distance, Inc.
Computers 5, Inc. d/b/a LocalTel
Digizip.com, Inc.
Ernest Communications, Inc.
Galaxynet Wireless
Genext
Global Crossing
GlobalCom, Inc.
Greenfly Networks, Inc.
Highland Internet Services
J & N Cable Systems, Inc.
Liberty Bell Telecom LLC dba DISH Network Phone &
Light Tower Fiber Long Island LLC
LightEdge Solutions, Inc.
Metropolitan Telecommunications Holding Company
NetRiver
New Edge Network, Inc.
Norlight, Inc.
OlympusNet
OlyPen
One World Telecommunications
OpenAccess
OrbitCom, Inc.
Reallinx, Inc.
Reliance Globalcom Services, Inc.
Silver Star Telecom Washington LLC
Telekenex, Inc
Threshold Communications, Inc.
United Telecom, Inc.

2.5.3 Non-Responders/Difficulty Contacting

Abba Communications
ALEC, Inc.
Cortland Communications /Seattle DSL
Envision Technologies
Global Telecom and Technology Americas, Inc.
Guiness Communications Inc.
Internet Expressway
MultiMeg
Orcas Online, Inc.
Peninsula Telecom of Washington, LLC
Primus Telecommunications, Inc
PUD - Benton
RapidWiFi
Saddle Mountain Wireless
Stroh Publications
Telebyte NW
Telovations, Inc.
Towerstream, Inc.
WCI Cable, Inc.
WDT World Discount Telecommunications Co., Inc.
Webbworks
Westgate Communications LLC
Windjammer Communications, LLC
Winfield Wireless

2.5.4 Not-Participating

Accel Net Inc.
Cactus International, Inc.
DASH Wireless
DAVIS COMMUNICATIONS, INC.
Eastern Oregon Telecom
eVolve Business Solutions LLC/Cincinnati Bell Inc
iFiber Communications
Internet Xpress
Interstate Telecommunications, Inc.
Master Mind Productions, Inc
Meriplex Communications, Ltd.
NCI Datacom
NextWave Wireless Inc./WCS Wireless License Subsid
Noel Communications Inc.
noWYR
Pend Oreille Valley Network, Inc.
Rabbit Meadows Technology, LLC
RioNetworks /UIDC Telecom

San Juan Cable
Spectrum Networks
Symplified Technologies,LLC
Thunderbird Broadband

State Broadband Initiative
Mapping Methodology

For the State of Wisconsin
Revised March 31, 2013

CostQuest Associates

LinkAMERICA Alliance

Contents

Overview

This document provides an overview of how the seventh required data set was collected and processed for the State Broadband Initiative (SBI) in the state of Wisconsin.

This submission builds upon prior efforts to increase in-state broadband mapping and planning capacity. Although each state has taken a slightly different path to building in house capacity, this cross-state partnership helps the LinkAMERICA team focus on comparable outcomes across the four states, where appropriate and support each state based upon the State's elected transition path. Our intent is not to make the states look and be the same, rather it is to leverage economies of scope and scale among the business processes while at the same time pursuing the longer term goal of transitioning sustainable program leadership to the respective states.

Work continues to shift to state partners. Much of this focuses upon the capacity building, planning and technical assistance components of the program. One immediate result of this is that in some of our states in-State partners have taken direct responsibility for the survey, validation and development of Community Anchor Institution information. The methods by which CAI data were developed are included as Appendix One. During this fourth program year we have one in State partner taking over the state web presence, both in terms of content and hosting. We also have States hiring in dedicated resources to support the program.

As expected, this document rests heavily on the prior drafts but has also been updated and expanded.

Significant changes include additions covering:

1. Trends in provider inputs
2. Modification to internal provider tracking
3. Increases in the amount of WISP coverage using propagation estimates or coverage obtained from Towercoverage.com
4. Requested changes based upon NTIA guidance
    a. Review of submitted speed with respect to NTIA supplied frequency table
    b. Review of NTIA speed guidelines, coverage processing and provider documentation
    c. Inclusion of Provider Universe Table (Appendix 4)
    d. Expansion of verification methods summary table
5. Transition planning with respect to capacity building within the State for Broadband map development (even while the technical data development components of the program continue to rest with CostQuest and the LinkAMERICA Alliance).

Treatment of the following subjects has been expanded:

1. Verification and validation
2. Data production methods

3. Provider advertised speed and coverage validation

As anticipated, the SBI program continues to mature and evolve. Technical leadership and strong program office guidance has been appreciated. We continue to focus resources on establishing stable business processes to track submissions, verify received and processed data, test for temporal stability and provide reporting deliverables consistent with NTIA expectations.

In our view, the mapping deliverable reflects (1) a good faith effort, which results in a reasoned response to the NOFA, Technical Appendix A, as well as supplementary program office guidance and modifications offered in phone calls, emails, and webinars, (2) a stable foundation for improvement and prioritization of both NTIA and state needs and interests , (3) a valid data processing model to support online mapping, consumer feedback, provider verification and reporting, and finally, (4) a valid use of the evolving data transfer model and its intrinsic validation methods. More importantly, the resulting data and online coverage maps that follow from this work are providing good input and context for the Broadband planning teams working across the states we have the pleasure to serve.

We also note that the mapping deliverable is increasingly important to state and federal policy makers as each assesses the policy ecosystem that supports the advancement of broadband access and adoption.

We close this methodology document with 4 appendices. Appendix 1 refers to efforts related to Community Anchor Institutions. Appendix 2 describes data collection challenges. This section describes some of the open issues, challenges and questions we are exploring. Our hope is to receive clarification and counsel from NTIA in how best to confront some of these issues, which are likely common across states. Appendix 3 describes the confidentiality framework explained by NTIA. Appendix 4 details the provider universe, those providers found to be non-NOFA compliant and those providing data.

Purpose of This Manual

This technical document was developed to provide transparency in our data production process.

Our goal is to illustrate a thoughtful process designed to meet the intent of the submission. Our hope is that we have developed a process that is reasonable, with respect to the data it deals with, as well as flexible enough to change with evolving NTIA requirements and lessons learned from the Broadband mapping community.

Data Sources

Developing the Provider List

Broadband provider lists for all states were developed from the following sources:

- Prior comparable mapping/research efforts
- State lists of regulated telecommunications, cable and wireless service providers
- State and national industry organizations (i.e. cable associations, wireless service provider organizations, telecommunications associations)
- FCC Form 477 respondents
- Third party data sources such as Warren Media, Media Prints, American Roamer Coverage Right, GeoResults Wirecenter Boundaries and TowerCoverage.com.
- Independent web searches
- Interviews with key state staff members and important community influencers

As one would expect in a dynamic marketplace, provider identification is an ongoing and important component of our work. Mergers and acquisitions, the use of multiple regional DBAs, the lack of any universal identity management attribute, and the generally complex parent-subsidiary structure of many telecommunications companies, make provider identification and tracking very challenging. Because of this dynamic environment, the Provider list is reviewed on an on-going basis and changes are made as necessary to ensure that the list remains current.

At the start of each round, email and telephone contact is made to all known providers. This time consuming, but necessary, process ensures that the list of contact persons remains current, and that providers are aware of data request changes and deadlines associated with each round. This also provides an initial read out if corporate policy has changed impacting willingness to submit updated information. Where necessary, we execute new NDAs with providers. We maintain this communication with providers throughout the Data Collection period, providing multiple paths and opportunities for participation in the program. Providers that respond too late to be included in the final dataset are flagged for inclusion in the next submission. Unresolved data concerns are also flagged and tracked so that we can begin working on a plan for resolution prior to the next data collection round.

As contact is made in each round, we qualify each provider by asking a series of questions regarding the type of service and speeds offered. If the provider does not meet the minimum specifications for a

Broadband provider (as defined in the NOFA) we make a note of the change in status.[1] Providers remain on our list and are included in program communications so that in the event that their service is upgraded or expanded their status can be updated accordingly.

Provider Outreach

To meet the program's aggressive deadlines and participation goals, LinkAMERICA believes it is critical to maintain rapport with providers. To do this we reach out to providers with regular project communications, including a program newsletter and links to the various State mapping websites. In several states we have participated in trade association and policy summits.

As described above, individual e-mails and/or telephone calls are made to all providers explaining the status of the program and requesting their continued support. In some instances we've also had the opportunity to support providers in their BTOP / BIP applications. Through these collective outreach initiatives, and our engagement with various industry associations, we continue to enjoy a healthy and appropriate relationship with Broadband service providers.

NDA

To provide protection for all parties involved, LinkAMERICA continues to honor the terms of our NDA. If providers did not execute the NDA in previous rounds they were offered the opportunity to do so in this collection round. New providers were of course also supplied with a copy of the NDA.

To facilitate the execution of NDA's, LinkAMERICA continues to use the DocuSign online document management solution. This system allows providers to review and digitally sign the NDA in a legally binding manner, and has been instrumental in achieving rapid approval and execution of NDAs with the majority of providers. In some cases, NDA's were individually negotiated to address specific provider concerns. In all cases, minimum standards established by the NOFA are honored. In other cases, providers chose to submit data without executing an NDA.

Provider Survey

Since six prior rounds of data collection have been completed, the LinkAMERICA team has a solid base of coverage and speed information with which to begin Round 7. This allowed us to provide flexible response options to participating providers. One option allowed them to review check maps of their coverage and speed data – submitting only corrections and additions to the existing dataset. (For provider convenience the check maps were created in both PDF and Google Earth (.KMZ) formats.) The second option was to allow submittal of completely new datasets, either in tabular form or in multiple other digital formats. For those without CAD or GIS systems, we continued to allow the submittal of printed/scanned maps and other written materials.

[1] As with other Grantees, we struggle with appropriate and consistent classification for service providers who opportunistically provision Broadband services. In this submission we continue to bring them into the analysis as a provider type "other". As the inclusion of this category isn't our primary goal, we are working to process data as we can. We are similarly categorizing and retaining reseller information. Appendix 4 illustrates the categorization of non Broadband providers within our provider tracking and verification systems.

Survey Methods

Once again, we used a secure digital survey process (via our provider portal websites) to collect and display information for providers. The Round 7 survey process was designed to accommodate both new and returning providers, and the different types of information they would be submitting. The following is a summary of the process encountered by each group:

New providers: New providers were routed directly to our standard survey where they were provided with templates for uploading data in tabular NTIA-compliant formats. As in previous rounds, if providers could not supply information in the requested format, alternatives were offered. These alternatives included uploading service-area boundary maps, exchange area maps, CAD drawings or customer address lists. From that information, the LinkAMERICA team developed a geographic representation of coverage and was able to build coverage features for each provider.

Returning providers: For Round 7 we continued to work with participating providers to improve their datasets. Check maps continue to be a useful tool to show providers how their area would be displayed on the resulting interactive state map and to get constructive feedback regarding corrections and changes that need to be made to their coverage and speed data. Generating these customized documents in each round is an extremely time consuming verification process, but it allows us to close many of the gaps that might have otherwise persisted.

Follow Up

After the release of the Round 7 survey in early January 2013,, LinkAMERICA launched an extensive effort to encourage responses. Every known provider was contacted at least twice during the months of January and February. The initial data submission deadline was set for mid-February, but we continued to accept "straggler" submissions into September.

No Response Policy

As mentioned above, every effort was made to contact each provider who appeared on our initial list. However, if no current information could be found on the company (i.e. no website, no valid phone number, and no contact person identified) they were removed from the list of "known providers". We believe the majority of those we were unable to reach were providers who have simply ceased to exist[2]. If we verify that a company is a broadband provider still doing business and are not able to get a response to our request for data, we make note of that in our datapackage.xls, and continue to reach out to encourage participation.

Summary

In summary, an intensive 45-60 day provider outreach and data collection process is initiated at the beginning of each round. In Round 7, given the data vintage of December 31, 2012, we began this process in December and the last submissions were accepted in March 2013.

While we continue to successfully engage the majority of providers in each round, the amount of manpower required to solicit complete and timely responses should not be underestimated. This process is one of the most costly and complex within the entire SBI program.

[2]The list of known providers and important submission statistics are contained in the datapackage.xls file.

Third Party Data Used

We have acquired the following commercial/restricted use data products:

- American Roamer, Coverage Right Advanced Services (tabular). This data served two purposes. The first was to verify the provider list and help find Broadband service providers not on other lists. The second was to verify the reasonableness of the Broadband service provider's submission.
- GeoResults Wirecenter Boundaries. This data was used in the verification of 'telephone' Broadband provider data. Where a public domain exchange boundary wasn't available, the boundary was used for coverage containment tests.
- Media Prints Cable boundaries. This data was used in the verification of Cable/HFC Broadband provider data. It was used to research valid providers and discover if that provider was offering Internet service.
- FCC 477 restricted use data were analyzed to find valid providers within a given area.
- Proprietary Provider Serving Areas. Since the first survey, a number of providers have supplied their engineering, serving area and/or franchise boundaries. We have maintained and enhanced these proprietary data sources.
- Towercoverag.com. This site offers a web mapping service to fixed wireless providers, many of which meet the criteria for our program. Providers can indicate through this site that they want to share their information for use on the NBM. In addition to using the site for provider validation purposes we pull mapping data for providers doing business in our state. In most instances we have found it necessary to contact the provider directly to get a complete and accurate submission of information for SBI.

We have included third party data sources which touch on each of the three major technologies analyzed within the SBI program. Each of these data sources tie back to a public domain data source, which provides a cross-verification mechanism for the commercial data product.

Although there are a large number of third party licensed data sources available, we remain conservative in our acquisition plans. From our limited analysis we are concerned about the ability to cross-verify additional third party licensed sources against public domain data. Further, we are unsure of how we may be able to integrate another data provider's view of valid Broadband providers within the definitions used by the NOFA (e.g. Are they using an FRN/DBA identity view or a marketing view? Can the provider supply in a 7-10 day window? Are they facilities based or not?). This leads us back to a statement we made in a 'lessons learned' Webinar (April 2010) about exploring a consortia to lower the cost of data acquisition and allow multiple entities to peer review the quality and methodologies behind licensed data products.[3]

Beyond these commercial data sources, we used a number of public domain sources. These included:

Geographic Data Files

[3] We also suggested forming a technical standards committee and a consistent system for confidence reporting.

- US Census TIGER data[4]

Sources that helped isolate providers, identity management or provider service areas

- NECA Tariff 4
- State produced exchange boundaries
- Carrier produced wirecenter boundaries (sometimes proprietary to provider)
- FCC Coals reports (321/325)
- FCC FRN API lookup tool
- FCC/FAA Antenna Registration System
- FCC FRN Lookup Tool (plain text search)
- USAC High Cost FCC Filing Appendices

Sources that helped isolate anchor institutions

- USAC Grant lookup tool
- USAC High-Cost FCC Filing Appendices
- HRSA data warehouse
- NCES data lookup
- State managed lists of schools (K-12), post-secondary institutions and libraries
- List of museums, conventions, and visitors bureaus from www.onlineatlas.us
- In state relationships to key stake holders.

Finally, challenges exist when dealing with the inevitable conflicts between provider-submitted data and third party sources (public or commercial). There is no guarantee third party sources are more accurate or timely than the providers' own reports. Indeed, some third party sources are based upon different standards than those specified in the NOFA, perhaps making them less reliable than information collected directly from providers. At the very minimum, provider data has a lineage and temporal status that we can identify. A concern we have with increasing use of third party data is that we have no way to verify its quality or development methodology. Particularly in rural areas we are concerned about what third party data may reflect based upon what we assume to be a small sample of information.

In other words, we may hit a wall in which we can't determine how the commercial source derived its coverage conclusion. To us this means that third party data sources are beneficial, but represent a supplementary view, not an authoritative one, of the NOFA defined Broadband market.

In short, we have chosen to use provider data as the baseline. We will challenge provider reports when third party data shows major anomalies, when submitted data conflict with prior submissions or when a consistent volume of consumer feedback points to a potential error.

[4] Census data were derived from < http://www.census.gov/cgi-bin/geo/shapefiles2010/main>, Census 2010 files. Roads were derived from the county faces and edges file downloaded at the same location and tiled for a full state.

Confidentiality and the Use of Licensed Materials

As a mapping vendor, we are reliant upon the cooperation of Broadband service providers. In large part, what underlies this cooperation is trust that we will not violate the proprietary and confidential nature of the data provided to us.

We are thankful for the confidentiality clarification that NTIA shared with us (included as Appendix 3). We use this as a guiding document to help us communicate with providers about what information NTIA considers to be confidential. Our suggestion is that NTIA publish this, or something comparable, to ensure a consistent interpretation of the NOFA and how it guides NDAs.

As some providers are non-responsive to requests for information, or lack resources necessary to put data into NTIA compliant formats, we have fallen back to the use of commercial data sources in several places.

For incumbent telephone providers we have used commercial wirecenter boundary products to filter Census Blocks and segments that are clearly out of their exchange areas. For cable providers we will use an estimate based upon Census Designated Places within MediaPrints named areas.

Public Engagement: Crowd Sourcing, Surveys and Social Media

Crowd sourcing (i.e., an intentional and carefully designed effort to tap into the collective intelligence of the public at large to expand our knowledge base) continues to be an important element of our data collection and validation process. An expanding use of social media is also an important strategy in our efforts to promote the programs overall and engage more citizens in the work at hand. To that end we offer various opportunities for the public to provide input via the online service coverage maps and the related 'Broadband story' process. These opportunities along with assorted public surveys have provided important information for the broadband effort in our state. As previously stated we see worth in engaging the public in this program and have found value in using social media outlets such as Facebook and Twitter to advance our process.

Consumer Surveys

Consumer surveys funded by the SBI grant have been hosted in our states over the course of this program. Many of which will be repeated over the remainder of the program by instate partners to establish and evaluate trends. The resulting data is helpful on a number of fronts in the SBI's mission to advance the access and adoption to Broadband. Survey data provides an important, albeit broad, gauge for assessing coverage information obtained by providers. For example, areas with widely available coverage (according to provider information), but lower consumer subscription levels (according to survey results), or perhaps where survey results suggest Broadband is not available, can be examined in more detail. Survey results are also very important to the broadband planning (and capacity building) components of the SBI program in that they help inform and formulate Broadband advancement priorities. Survey results also help inform Broadband policy discussions on both the local and state levels. Finally, survey results provide important information to the service provider community regarding market demand and Internet use in specific communities (i.e., regions).

Social Media

The phenomenon of social media is widely documented and is emerging as an effective access point for public engagement. We continue to explore appropriate ways to use a variety of social media venues in our SBI efforts. All of our efforts are informed by and consistent with relevant state statues and guidelines. Each state has a different perspectives on if and how the state will participate in the use of social media. Some state requirements are well defined and some are still being formed. Where appropriate, we use LinkedIn, Facebook and Twitter to support our work. A central focus is on promoting awareness of the program and seeking to expand engagement. In some situations we find that sub-program initiatives (e.g., regional planning teams) are making very effective use of Facebook to help inform and engage citizens impacted by the SBI program. In addition, we continue to evaluate how Facebook and Twitter can be used to drive public input on two important crowd sourced issues: online speed tests and input on map accuracy. Based on data obtained through our web site traffic monitoring process and readily available social media tracking processes, results are promising.

Capacity Building and Transitioning to State Partners

A fundamental goal of LinkAMERICA has always been to transfer knowledge and capacity to our in-State partners.

Within each State, transition planning and responsibility for specific activities is on a slightly different timeline. Much of this is driven by resource availability and partner identification within the State. For example we began transitioning the responsibility for Community Anchor Institution data to the State of Alabama in Round 3, starting with the use of interns to validate Community Anchor Institution data. In Round 4 the state's responsibility expanded to include collection of all CAI data, and in Round 5 the effort culminated with Alabama assuming responsibility for the CAI submission. LinkAMERICA supported this process with detailed transition documents and technical support. Alabama is continuing e the transition process assuming responsibility for the state website in the first Quarter of year 4 and is on track to assume hosting responsibility of the state map by Quarter 2.

In Idaho the SBI Framework Coordinator took on the responsibility of reaching out to CAIs in round 5. Since that time he has been working on a new outreach tool to enhance the data collection effort. Idaho, Wisconsin, and Wyoming are all working toward the goal of taking on responsibility for hosting the state map and website by the end of year 4. LinkAMERICA is providing support for this progression in each state with program leadership, technical assistance, tools, and project plans to ensure a smooth transition process.

Data Sharing With Other States

Where possible, LinkAMERICA works to share data with other state mapping entities. This data exchange tends to take two routes.

First for wireless providers if we find a fair amount of coverage that crossess into an adjacent state, we will ask the provider's permission to convey this information to the neighboring states. If the permission is received, we send the data to the mapping agency.

Second, in circumstances where we receive a speed that is outside of the technology speed 'norms' and this provider offers service in another state we try to check with other covered states to find out if the service is comparably marketed.

Trends in Submitted Data

Overall we note several important trends in this data submission. The list below represents general trends and not a scientific survey.

We note the following trends:

Activity from the FCC regarding the Connect America Fund has influenced the activity of providers and policy makers. In late December 2012 questions regarding coverage, partial coverage and updating to the round 6 maps took on much importance. This particular Public Notice generated a number of complex and ambiguous questions. We tried to assist users as best we could within the constraints of available time.

The coverage of advertised speeds is increasingly important. More and more providers are specifically concerned about where the submitted NTIA footprint shows available of 4 x 1 Mbps or 6 x 1 Mbps service.

Large national providers are beginning to submit block level speed information. In round 7 Windstream submitted block level coverage and speed. Other national Wireline providers, are more carefully reviewing the submitted coverage to ensure that it is consistent with their expectations.

xDSL speeds are increasing. More and more xDSL is likely ADSL 2+, VDSL, shortened loops, pair bonded or some combination of these. As we talk to providers who trigger speed/technology tripwires, we receive more and more feedback about the presence of these new technologies to enable speeds comparable with DOCSIS systems.

DOCSIS 3 is becoming the norm. Most cable systems are becoming DOCSIS 3.0. Over time we are seeing the DOCSIS 2.0 areas diminish. In some DOCSIS 3 areas there tend to be pockets of non DOCSIS 3 in predominant DOCSIS 3.0 markets.

There seems to be an increase in acquisitions among fixed wireless providers. Sorting out the acquisitions and territory abandonments has been complex and time consuming.

Fixed wireless providers are offering broadband services approaching 1 Gbps. This is occurring both in terms of licensed and unlicensed spectrum. Part of this is driven by where a provider has fiber or high capacity wireless backhaul but we are receiving more and more information from providers and radio manufacturers specific to very high speed wireless services. Although the service can be deployed

within the 7-10 day NOFA window, these higher speed services tend to be purchased by high capacity customers. It may be worth reconsidering the speed norms in this category as well as adding a field in the data table to indicate when a speed value is geared toward a specific end-user class.

There is less and less of a distinction between fixed wireless and mobile wireless. As firms market LTE and/or WiMax as home DSL alternatives we are a bit unsure how these two classes are to be established-what is the operating distinction between Transtech 80 (mobile licensed) and Transtech 71 (fixed licensed) when both are used as in-home Broadband service?

Satellite providers are advertising broadband services comparable in speed to xDSL. Some satellite spectrum codes are not available for use in the data model. Some satellite providers are beginning to indicate a difference in speed within the states. We are working with providers to clarify this new type of submission.

We continue to see a number of national Broadband providers who do not show broadband coverage within pockets of otherwise covered areas. In the figure below, the orange represents Census blocks which are NOFA broadband covered. The transparent areas have no NOFA broadband coverage from the same provider.

Figure 1--Uncovered pockets within urban, covered areas

This coverage drop-out appears to be happening in urban Census blocks typically with schools, shopping malls, universities and large businesses. We don't know why this is happening, but it could be an impact of the NOFA restriction on 7-10 provisioning. This is a noticeable artifact in the data and does challenge the notion of some who see NOFA compliant Broadband coverage as a uniform surface across an area.

We see a pattern of some providers clipping their coverage to reflect what we believe are license boundaries. Although the coverage clips have been apparent in the past, they appear more abrupt in this round.

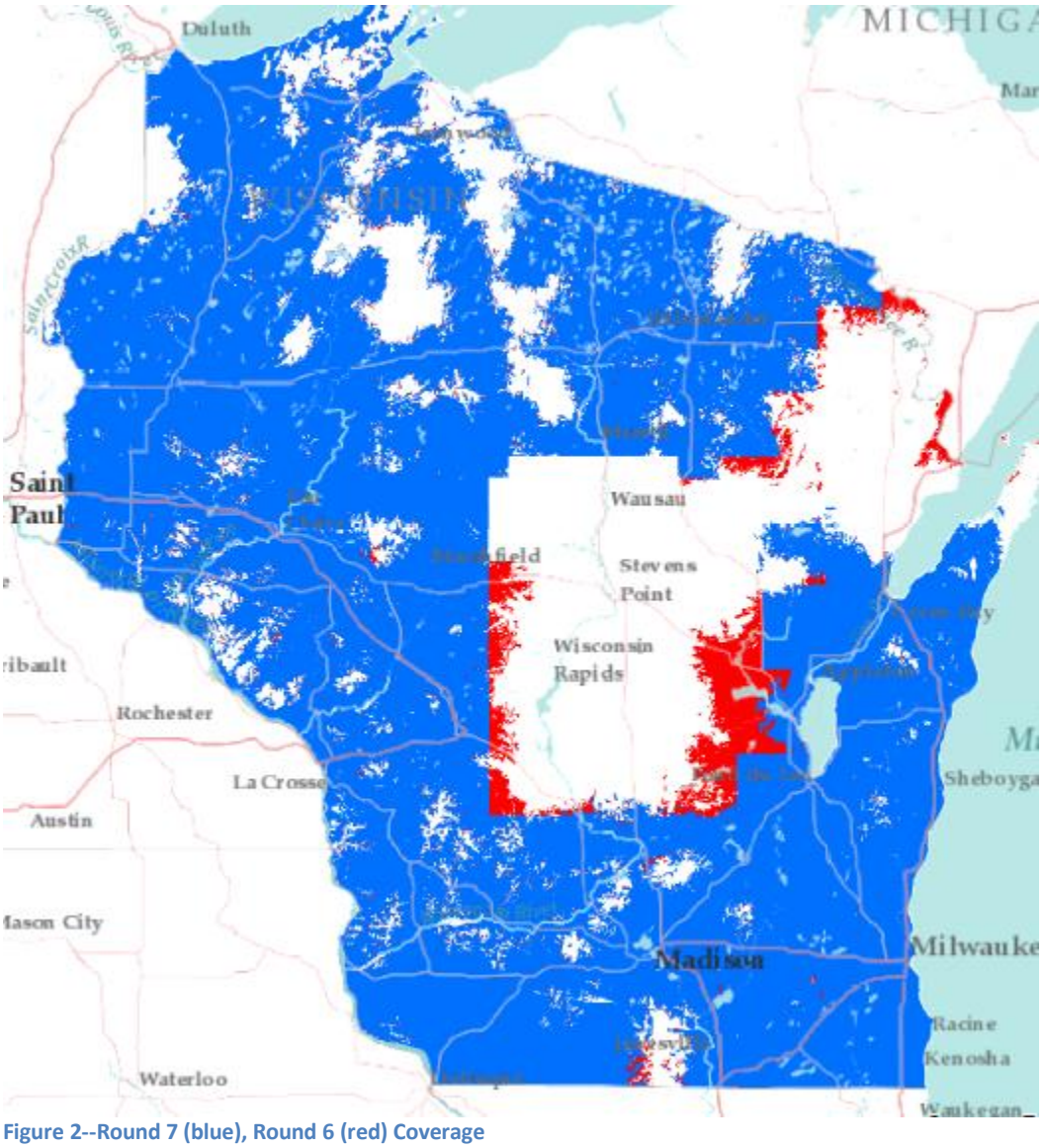


Figure 2--Round 7 (blue), Round 6 (red) Coverage

Data Production Process

To support our objective of transitioning the data development process to our State partners, we continue to model, refine and document our data production process. We find this to be a very beneficial step for two purposes.

First, it helps us understand why (and if) a task is being done, and if it is being done efficiently. Much of this program started so quickly that it was difficult to plan logical integration and hand off points among the various workgroups. Further, we are currently in the process of consolidating much of the process data (check-ins, check-outs, metadata) and we can use this process model to efficiently plan cohesive information architecture.

Second, our process documentation and modeling helps explain why resources are being consumed in a particular way. This helps our State partners plan for in-sourcing specific tasks as their time and budgetary constraints allow. It also helps our LinkAMERICA team better plan and cross-train members to deal with the work surge that occurs 30-45 days prior to submission.

Finally, documenting and modeling our process helps us to take advantage of increasing specialization and proficiency with certain types of data and management responsibilities. In submission 3, we had identified data "czars" responsible for check-in and check-out of data. That data czar helped to bridge the gap among receipt functions, provider feedback, production and DBA. In round 5 the data czar was also tasked with alerting on speed/technology tripwires. This individual was responsible for taking the initial review of each submission and determining if an NTIA speed/technology warning would be triggered.

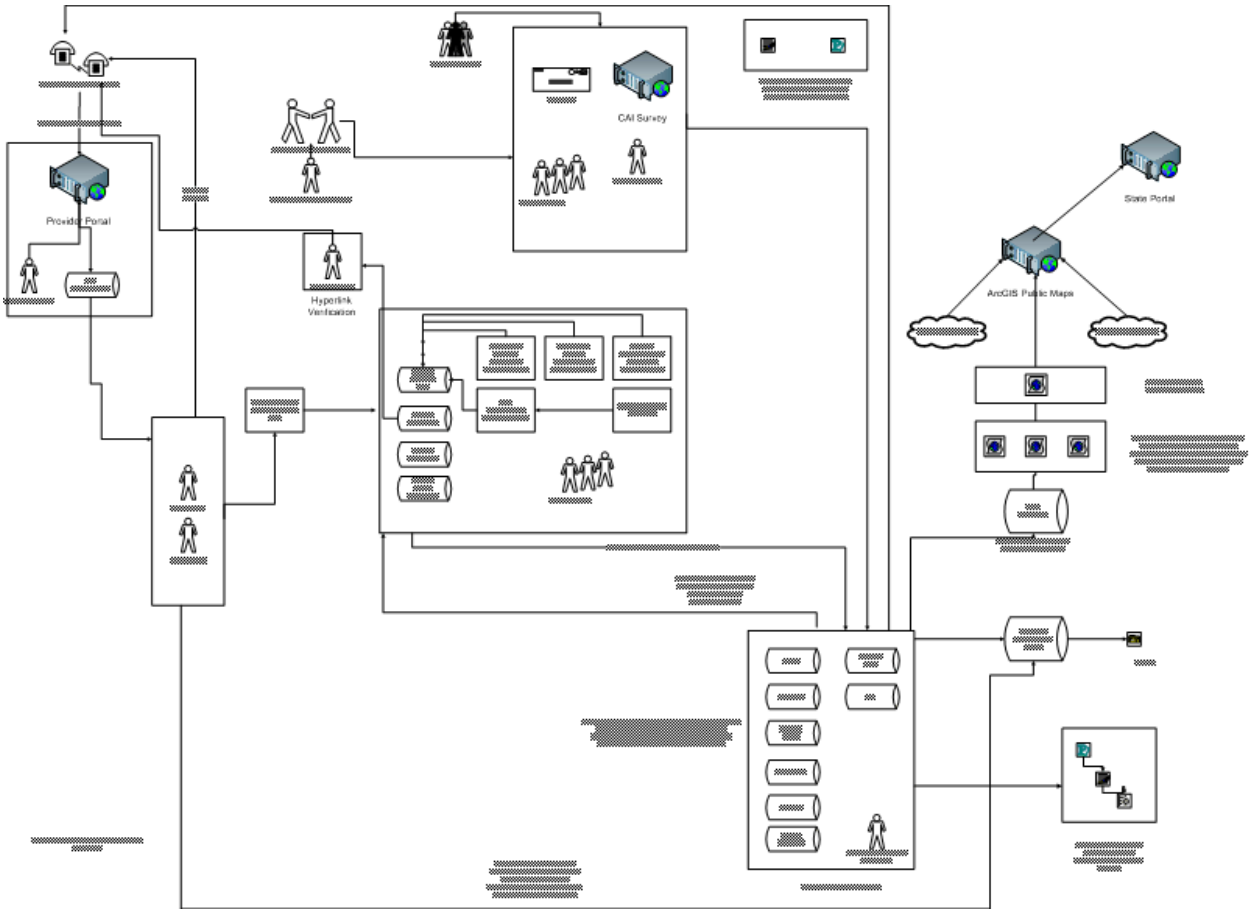


Figure 3—SBI Data Development Business Process Diagram

Provider Tracking In the Cloud

Prior to initiating the Round 5 survey, LinkAMERICA transitioned in house provider tracking systems to a Cloud based application, TrackVia.

The movement away from desktop solutions was based upon several factors. First, the architecture these systems were designed under no longer met the program realities. For example, deliverables like Datapackage.xls were not contemplated when the original provider tracking system was developed. Second, the ability to share data across multiple geographic areas and organizations was becoming increasingly important as the program evolves and responsibility moves to in-State partners. Third, portions of this data need to securely transition back to State resources who may or may not be able to support a specific IT infrastructure. These factors combined to make the Cloud applications a valuable alternative.

As with any IT transition, the process has not been without challenges. Nonetheless the investment in time and resources has proven to be effective and worthwhile. We anticipate further movement away from desktop oriented architecture to a more open, Cloud type solution.

Data Production Methods

As raw data were received from the provider community, attention turned to normalizing the disparate submission formats[5]. The team considered each submission with respect to the following criteria. These criteria are important because they perform the basis for our verification and quality assurance process. In other words, we have to appropriately scale our data verification efforts to match the scale or ambiguity of the following:

- Locational certainty
- Speed certainty
- Temporal certainty
- Provider and network ownership certainty

The team's goal was NOT to quantify a particular degree of precision with respect to any of these criteria. Rather, we are working to attribute the above "certainty attributes" to each submission, and will continue to implement quality assurance and verification mechanisms that are resource-appropriate for each.

Deriving Broadband Coverage Information

Broadband Coverage[6] was normalized into four formats:

1. Coverage in Census Blocks (2010) of 2.00 or less square miles
2. Covered Street Segments (2010) in Census Blocks greater than 2 square miles[7]
3. Address Level Coverage (point data)
4. Wireless Service Areas (SHP file format)

With each submission, the team went through a series of steps to normalize and categorize the data. Since data arrived in many different formats, and at many levels of granularity, the following normalization procedures were used:

- Determining the nature of service being provisioned (who is providing service and what technologies are in use)
- Planning an attack strategy for the submission –understanding the data and assigning team members to various tasks
- Alert provider relations staff if the received data trigger an NTIA speed/coverage tripwire.
- Georeferencing the data; QA the georeferenced data
- Geoprocessing the geo-referenced response

[5] In line with NTIA Best Practices we continue to request and receive a large number of data input formats. This ranges from tabular block lists to hand drawn maps.

[6] Speed, Anchor institutions and Middle Mile facilities are discussed in later sections.

[7] To help clarify issues relating to Census block area and vintages in use, our team published a technical paper to the Grantee workspace. Because we were unsure if this standard should be implemented uniformly, this document was never distributed to the provider community.

- Segregating the submission into the correct NOFA-compliant submission formats.
- Apply appropriate source metadata[8]

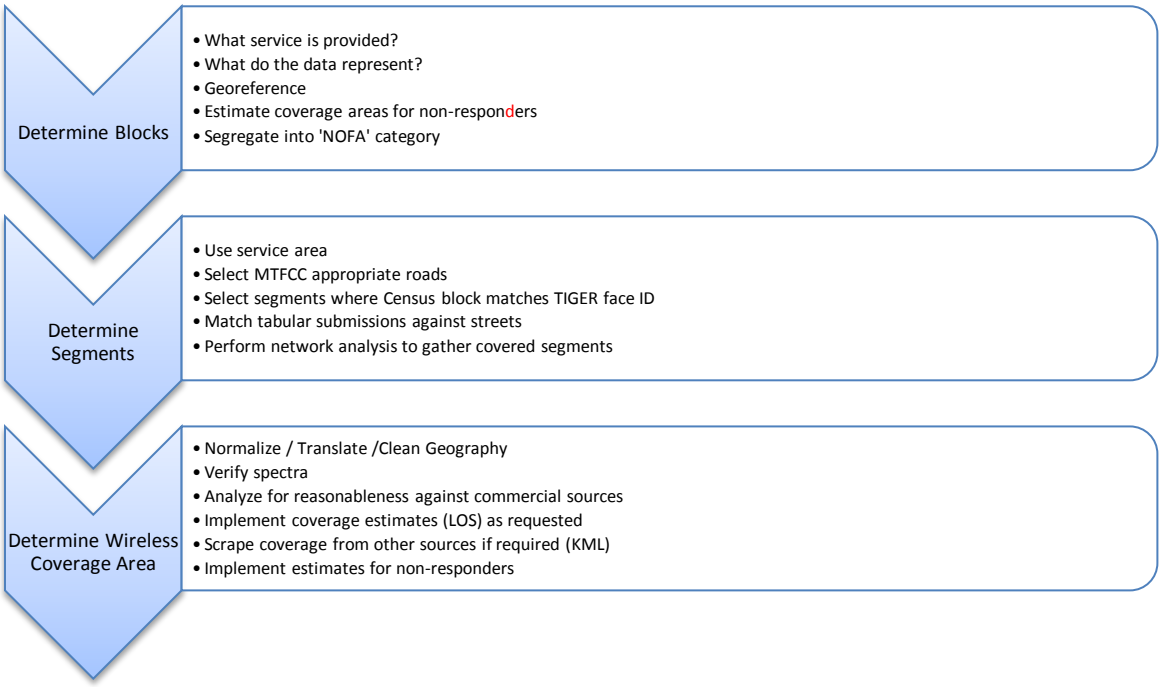


Figure 4-Components of Broadband Coverage Process

Impact of Program Change

There were several important program changes that impacted how Broadband coverage was developed and submitted to NTIA in Round 7.

Speed Examination

Given recent concerns about the depiction of speed and what that mapped speed represents, LinkAMERICA invests considerable time requesting detailed information on speed which appeared to be beyond normal speeds for a given Technology of Transmission given the NTIA supplied frequency tables.

Based upon these conversations we learned

A) For incumbent telephone providers; the speeds beyond the normal xDSL range represent significantly shortened copper loops, as well as upgrading DSLAMs and modems to support ADSL2+ or VDSL.

B) For cable providers the intermixing of DOCSIS 3.0 and non 3.0 systems in a market area is typical and sometimes reflects a circumstance where segments of plant cannot be upgraded to DOCSIS 3.0. This variance can be at a level below the Census block. In these cases the maximum advertised speeds

[8] When our team logs a submission into the staging database we record at least two attributes. One records the method used to derive the coverage, the other records the method by which speed was attributed to that object. Other attributes carried to NTIA carry source meta values as well.

remain to represent the market area but the plant variance is typical. We also have one 'cable' provider who is delivering DOCSIS 2.0 over fiber plant (RF over Glass or RFog).

C)There exists a fundamental disconnect between some providers reporting a service qualified speed--the maximum speed available at a structure versus other providers submitting their maximum speed at the market (MSA/RSA level). Both submission paths are available to providers but the likelihood of providing a speed incompatible with a technology is much greater for providers submitting market level speed. For the most part, wireline providers are submitting block level speeds. This creates a fundamental disparity between the wireless speed reporting between wireless and wireline providers.

D)Fixed wireless provides are using new radio technology to quickly deploy services which rival and sometimes exceed those of wireline service providers. These speeds are being advertised, sometimes on public facing websites as well as using direct field sales staff to target specific high demand customers. These services are actively marketed but they challenge the data model in that the speed is marketed and available within 7-10 days of request but the nature of the fixed wireless submission forces attribution of this speed within a potentially large geographic area.

E) There exists a minority of providers who submit a theoretical speed that is unmatched by their web advertising. In these cases we request clarification from the provider on the inconsistency. Our experience has been that providers will modify the speed to be consistent with their marketing and advertising.

F) The maximum advertised speed offered is not always clear. Sometimes the speed is described in advertisements in terms of a combination of video and data. Other times it is data not video. Some providers allow a customer to select how much bandwidth they want to allocate to their data stream versus video stream. In other words the bandwidth available to a household is constant but how it gets allocated among the data versus video becomes a customer or service directed choice. This makes getting Maximum Advertised Downstream speed very difficult because it is not just a product of the broadband network which we are mapping but also the customer's selected service package. Upstream is rarely advertised. Different marketing channels (Business to Consumer versus Business to Business may yield different marketed speed combinations.

Provider Definitions

Within our provider verification process we work to derive a state level provider match against third party data sources. As discussed in the early pages of this manual, there is no guarantee that a third party data source is any more accurate than submitted data, nor does it necessarily reflect the provider ecosystem specified in the NOFA, Technical Appendix A. We devote significant resources to matching our submitted data against outside data sources. In many cases this becomes a judgment call trying to match provider names across systems. It is a difficult and somewhat arbitrary process. Nonetheless we

do believe it has value because it forces a re-examination of who we believe is an appropriate provider within a non-NOFA context[9].

The use of a provider match system, as well as the webinar comments (3/17/11)[10] directing grantees to estimate, wherever possible, non-participating providers have made us back away from one of our fundamental assumptions in data collection. As discussed in prior versions of this manual, we had developed a certain "hold-out" class of data when a provider's data wasn't of sufficient quality to verify, or we were unable to put it into the data model (e.g. address points submitted for fixed wireless). In submission four, much of this hold-out data was included[11]. In some cases this involved using simple polygons to capture a wireless ISPs serving area. Other times, if we are confident in the coverage, but can get little clarification on the submitted speeds or frequencies, we release the coverage and note in our internal metadata the source issues with the other attributes.

In the weeks leading to submission 5 we received a request from NTIA to clarify the presence of unusual shaped wireless polygons. Our interpretation of this was a request for information relating to the source of these data which do not appear as propagated coverage. Although the 'unusual shapes request' represents a very small portion of the submitted data, it begs an important question about the expectations with respect to wireless coverage patterns. We look forward to working with NTIA to address these issues in a fair way across States and providers. We would not want to create a coverage dichotomy where advertised coverage was disallowed from the NTIA submission because of an expectation about how advertised coverage should appear. One concern we have when we develop a coverage estimate which differs from a providers advertised coverage pattern, which should we submit? As of the current round, this remains an open question.

Finally, we use the provider type classification of 'other' to bring specific aspects of certain provider's data into our submission. There still seems to be confusion on how to handle provider types where a provider offers multiple paths to provision Broadband for typically business customers. Rather than waiting for certainty on the answer, we bring the provider in and list them as provider Type "other". Our sense is provider Type "other" will continue to expand in subsequent submissions.

Clearly one challenge is the data, but an equally significant challenge is appropriate messaging around this "other" provider type category. We do not want to leave consumers with the impression that they can get a high capacity fiber or microwave link despite the fact that the hospital next to them or in a nearby Census block can get this service.

[9] We have requested from NTIA information on how provider matching is done within their QA process; beyond the relatively short whitepaper posted with the national map <http://www.broadbandmap.gov/blog/wp-content/uploads/2011/02/DataComparison_Methodology2.pdf>, we have not received any more detailed information on how providers are cross verified between submitted and third party sources at the national level. Our understanding is licensing concerns are holding the release of this information.

[10] Clarifying comments from Akins Lawl indicate the Program Office does not want Satellite providers estimated if the provider is non-responsive to data requests (email 9/12/12).

[11] We continue to process older submission data looking for information and methods by which we can estimate coverage information. This will be an ongoing process.

After the April 2011 Grantee conference, LinkAMERICA submitted a paper describing our provider classification system[12]. It is our feeling that understanding the type of provider is essential to appropriate verification methods.

Coverage Geoprocessing Methods

The next section discusses how data were georeferenced and geoprocessed given a particular submission format. We have yet to find a particular method that works across all submissions. Rather we tend to tailor our geoprocessing to meet the specifics of the service provider and data submitted.

In most cases, in Round 7 we were not provided with street segment geographic objects for Blocks greater than two square miles (large Blocks). This necessitated subsidiary geoprocessing. As stated before, our first goal was to derive block level coverage. Then, for Blocks greater than 2.00 square miles, we moved to a segment gathering processing. The segment process will be described in the last section.[13]

Block Level Coverage Derivation Using Service Point Data

A number of providers submitted point level customer data.

In some cases the submissions themselves were not internally consistent. For example, in the image below, unprojected points are shown, while the Census block polygon to which the points are supposed to "belong" is highlighted. In this case, one of the following scenarios has occurred: block attribution is wrong, the points are not in the location to which they are attributed, or different block shapes were used than what is assumed.

[12] https://sbdd-granteeworkspace.pbworks.com/w/file/42309493/provider%20ClassificationFINAL.docx

[13] As has been discussed previously, we note inconsistency in how providers are supplying information at the block and segment level. Beyond the temporal differences, we see that providers are computing area differently, as well as including or excluding water areas. This provides an inconsistent measure across providers for the 2.00 sq mile cut off. Our preference would be to provide guidance to service providers within our states, but our concern is that we will inconsistently message this with grantees in other states. We would appreciate consistent guidance from FCC/NTIA on this topic.

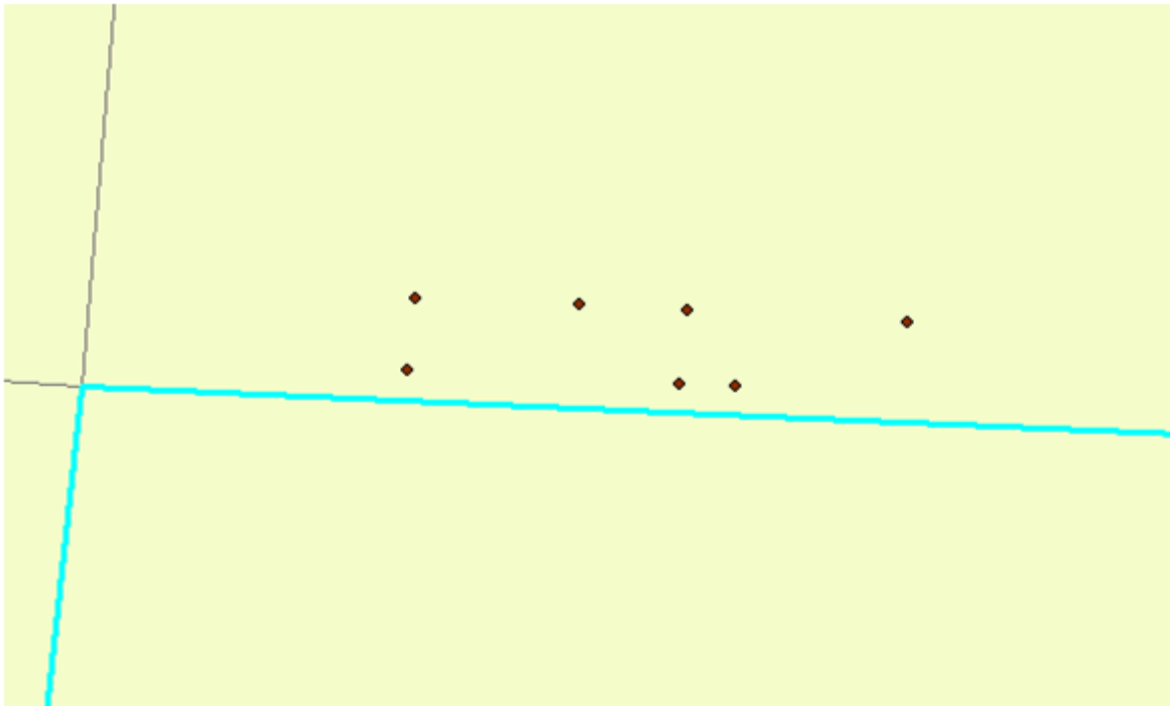


Figure 5-Internal inconsistency in submitted data

In other circumstances, we found that inconsistent geocoding standards may produce misleading results. The next image shows point level data, and the Blocks are colored based upon the counts of points intersecting Blocks. The challenge this presents is that if geocoding was performed on a different dataset than the block boundaries (the road traces are not coincident with block boundaries) and/or geocoding was done without an offset, it becomes problematic to assign coverage to a Census block based upon only the point locations.

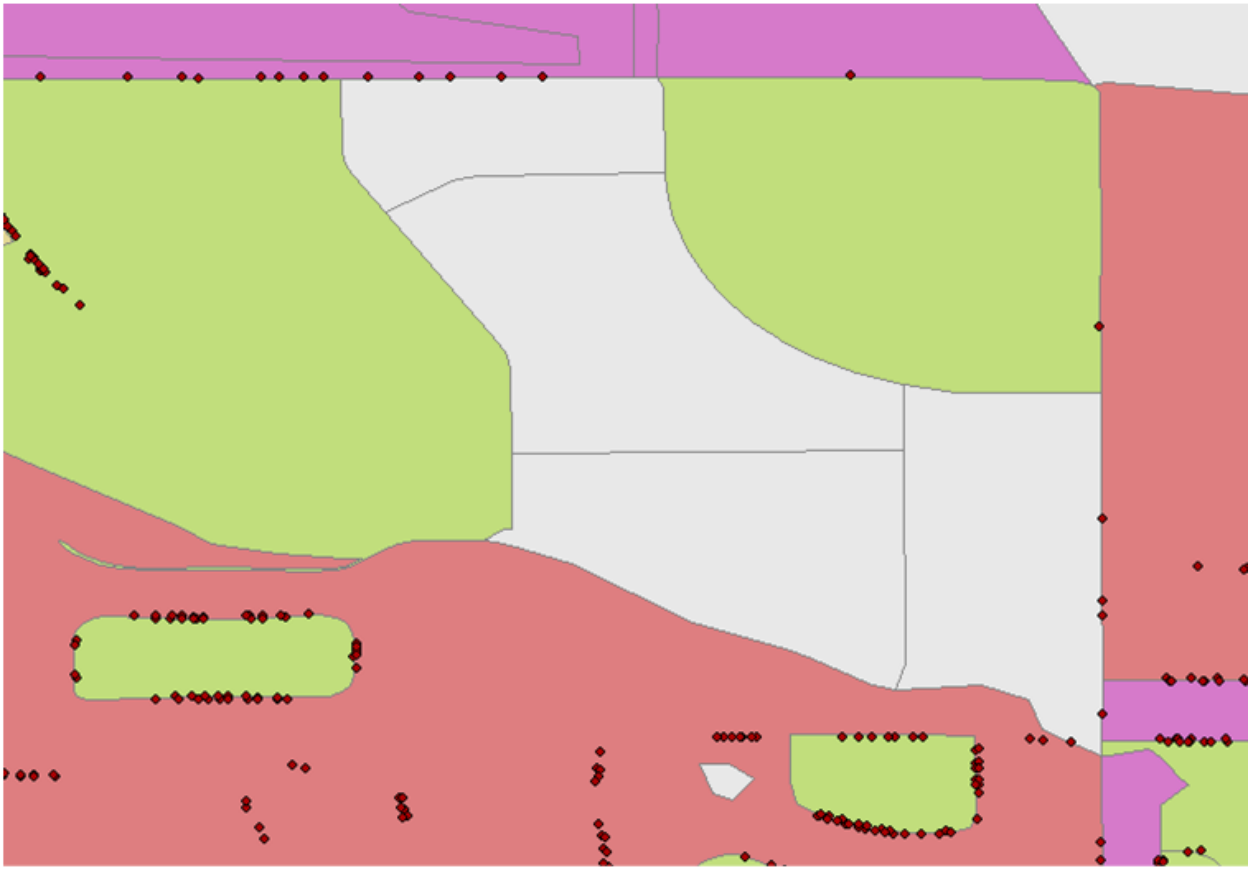


Figure 6-Block Coverage

For this reason, where we were provided address point data and asked to generate covered Census blocks, we elected to use a 200-foot buffer to select Census Blocks that intersect our points.

We also see a number of providers submit customer data and facility data. Their intent is to allow us to have two primary sources from which to derive the most accurate coverage. In these cases we tend to look for clusters of customers in areas where we see no facility based coverage.

With respect to deriving Block level speed from sub-Block data, we have instituted a business rule where the predominant speed in a Block is the speed we attribute to the Block.

Block Level Coverage Derivation Using Customer Facing Plant Level Point Data

In other circumstances, providers submitted point level plant data. From what we could gather, these points tended to be customer-dedicated terminals. Typically, these providers were high speed Broadband producers—which may somewhat strain the definition of Broadband as other providers supplying comparable services specifically disclaimed the ability to provide high-capacity Broadband services in the required 7-10 day interval. In these plant point data submissions, we had similar concerns to the point level customer data, but two factors tended to make us use a more conservative intersection buffer. First, we tended to have far fewer points to work from, so our concern was grabbing too many covered Blocks as the Blocks tended to be much smaller in these urban areas.

Second, these plant points tended to be dedicated to distinct customers, but it was difficult to know which element of the customer's campus to attach coverage to.

In the case of the image below, given a small shift to the left, it would be easily possible to gather 1 to 3 Census Blocks from this point. Although orthoimagery is helpful in a circumstance such as this, it is still indeterminate.

Thus, in the circumstance of plant level point data, we used a 100-foot intersection buffer.

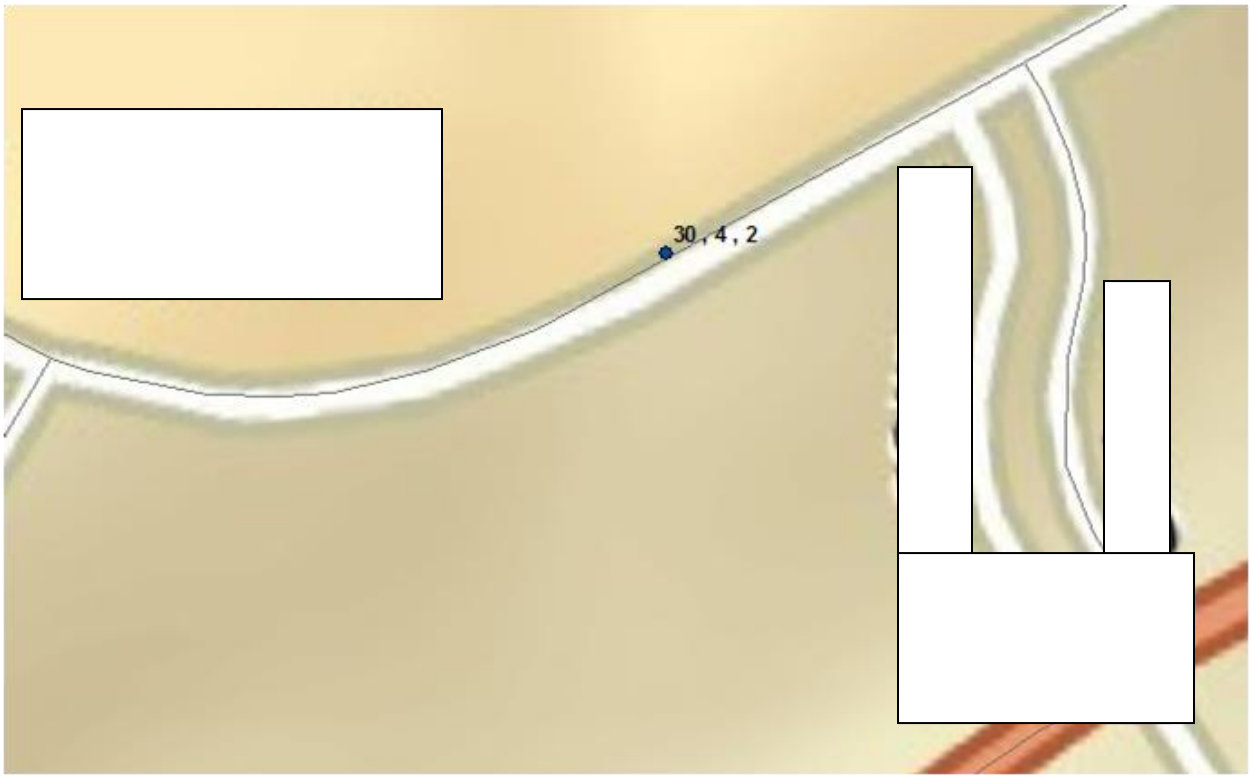


Figure 7-Plant Point level data

Coverage Derivation Using Linear Facilities Data

A number of providers submitted facilities data. We handled this data in different ways depending upon what we believed the facility data represented.

Most telecommunications networks are divided into two components. Feeder - supplies higher capacity nodes (eg. DSLAMs, Fiber Nodes). Distribution - usually supplies customer premises (NIDs, Pedestals, Taps, ONTs). Where we could discern what facilities we were provided, we used different methods.

The next image demonstrates a geo-referenced CAD image as given to us by a service provider. Note the light and dark green shading. We would infer that the lighter segments represent distribution and the dark green represents the feeder network.

In the case of a combined strand map, we used a relatively tight buffer of 200 feet to gather covered Census Blocks. Our intersection tolerance is based upon an assumption that our data likely represent a

situation comparable to customer point level submission in that we have most of the network footprint captured.

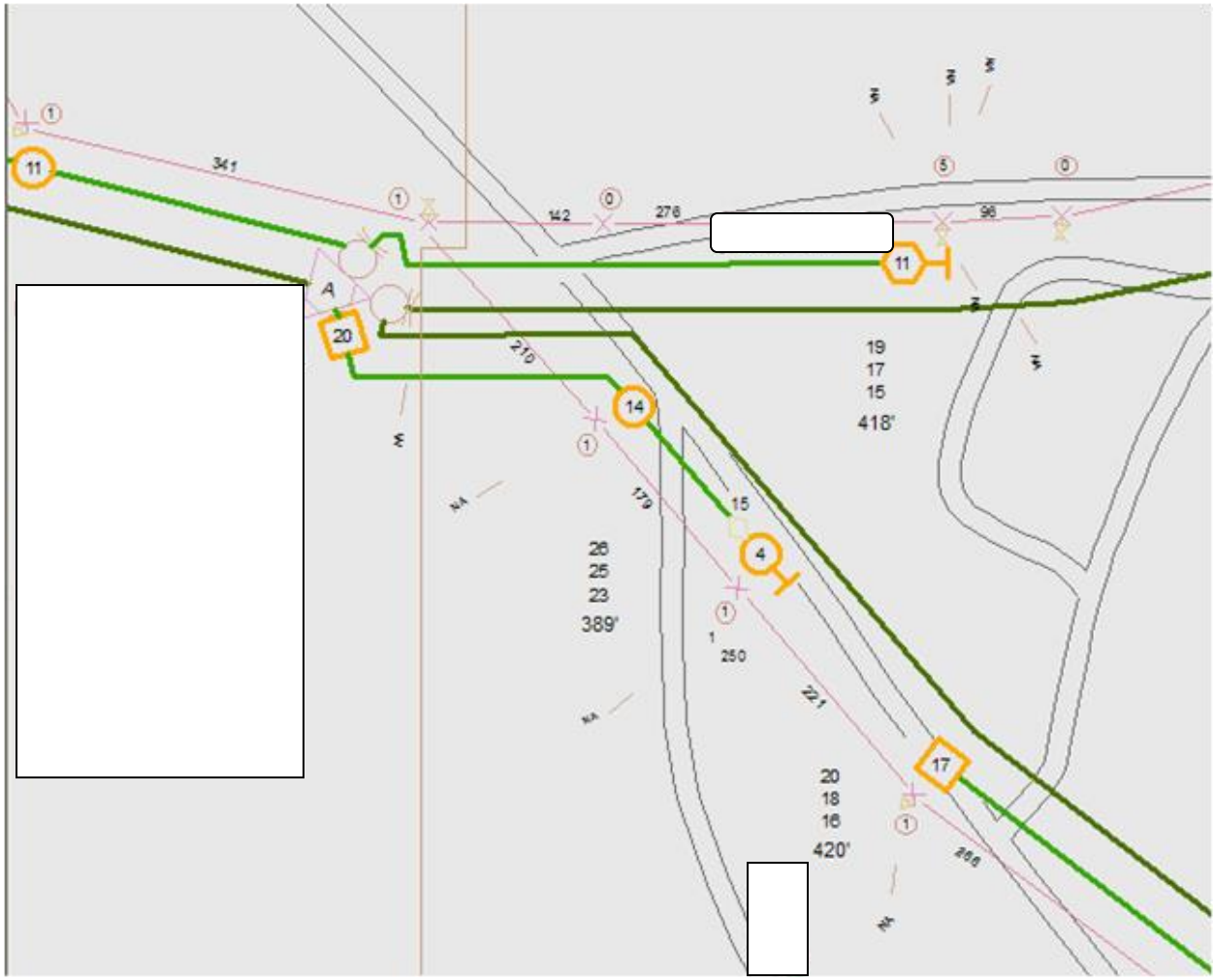


Figure 8-Georeferenced CAD information supplied by Broadband provider

In other circumstances, we were provided engineering information that we inferred to be feeder only. This inference was typically based upon the presence of fiber optic equipment only. In these cases, we used a more generous 2,000 meter Census block intersection. The 2,000 meter criteria was based upon an informal survey of population in proximity to the geo-referenced strand data, but it could be varied based upon a more complete survey.

Coverage Derivation Using Covered Street Segment Data

In some cases we were provided with covered street segment data. Covered segments tended to come from two sources.

In some circumstances, providers gave us CAD data, which was not drawn in a projected manner. This is relatively common for older engineering data derived from hand drawn records. This meant that our

team geo-registered the image into an approximate position. In this case, the boundary streets were selected, and an enclosing polygon was derived. The intersection of this polygon and the Blocks within became the geoprocessing method to derive Blocks.

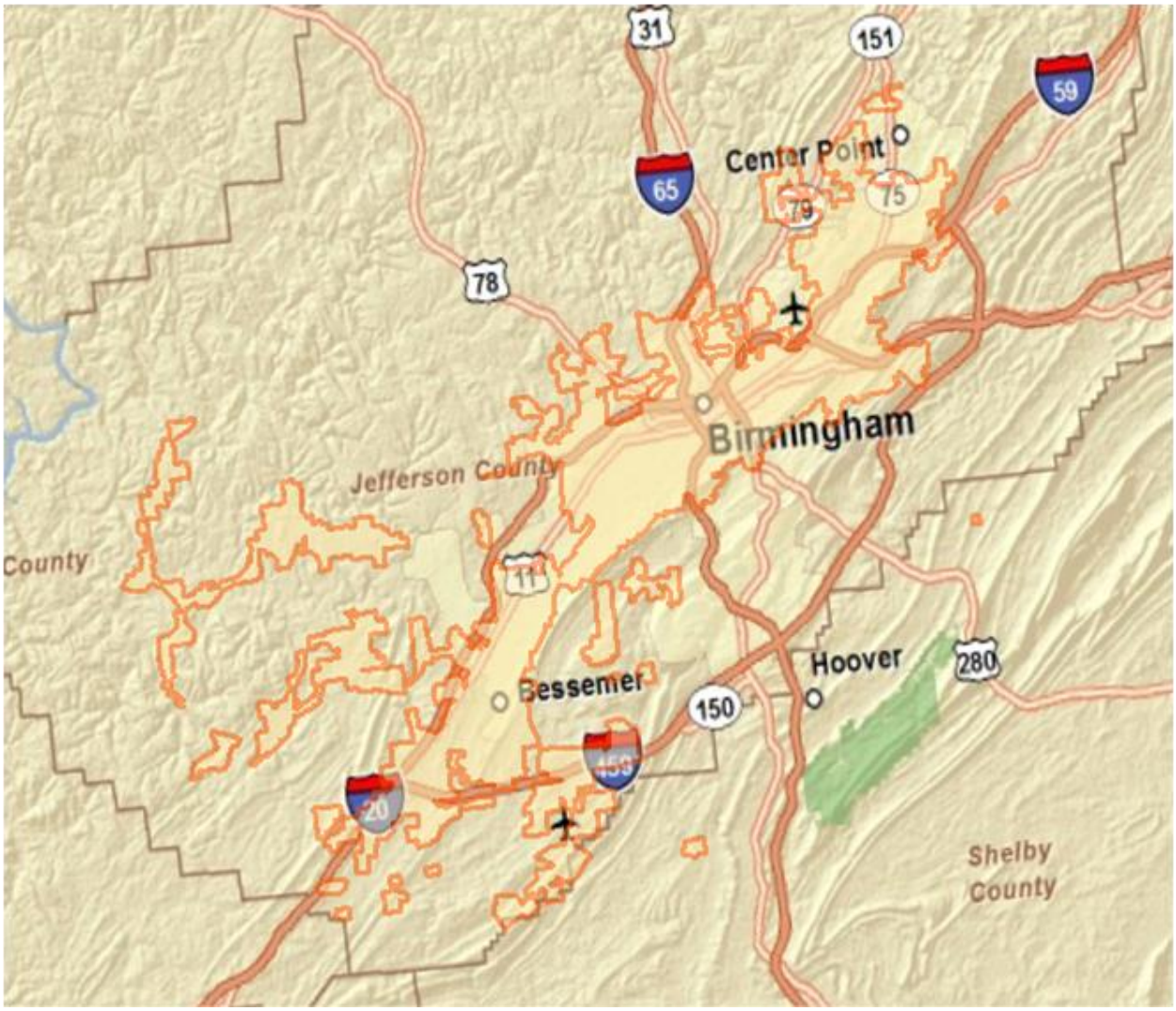


Figure 9-Coverage derived from street segments

In a second circumstance, street segment data was developed during coverage estimation. Handling the estimated data is discussed below.

Coverage Derivation Using Serving Area Point Submission Data

In other cases we worked with providers to derive service areas based upon point plant data. In these cases we were given a serving node and an appropriate road length service boundary. There is an important distinction from the plant data discussed above. In this specific case, the data submitted was a node that served many locations--such as a Central Office or DSLAM. This is contrasted with the earlier example in which the point represents a node serving only a few customers.

When trying to derive coverage from Central Office or DSLAM nodes, the team used ESRI Network Analyst to derive covered road segments honoring these road engineering parameters.

The figure below shows street level coverage derived from Central Office and remote DSLAM point data.

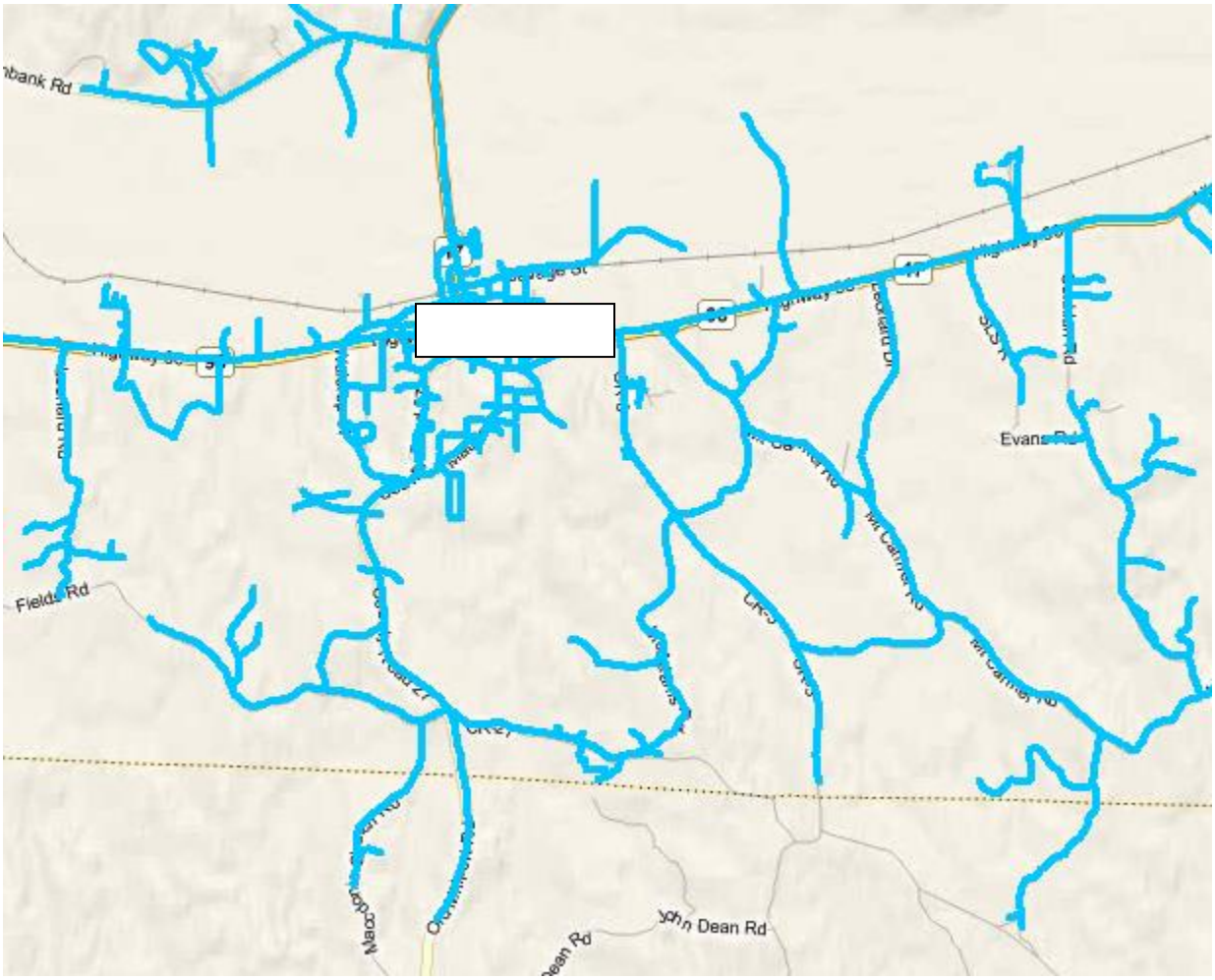


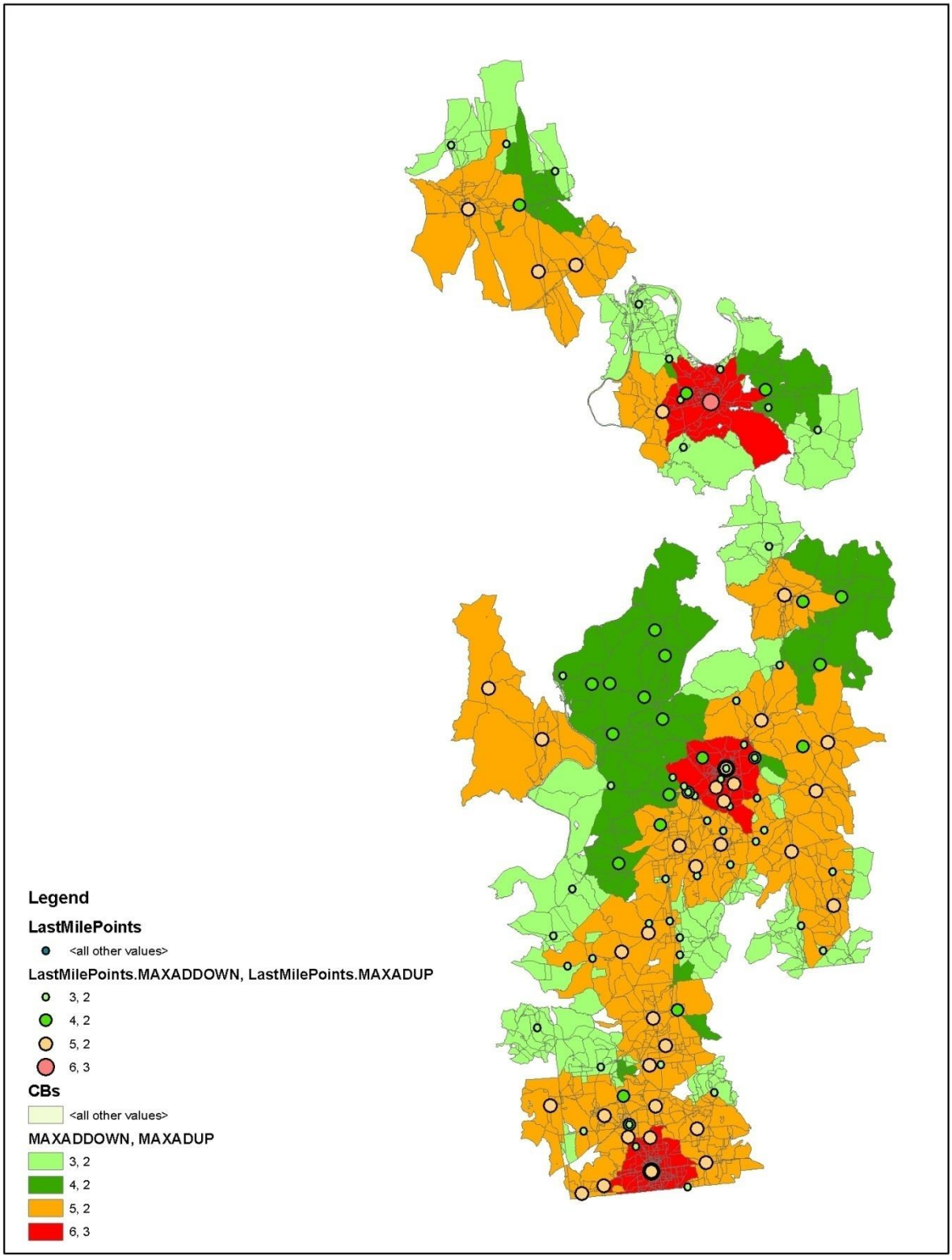
Figure 10-Coverage derived through road paths

In response to Provider feedback we revised this process to include a larger variety of TIGER road types. In Round 1, unimproved roads were not used. In the current submission -- particularly to improve estimates in areas bordering parks and public lands -- a wider class of TIGER roads was used.[14] We still get concerns from service providers about missing road segments and incorrect centerline appearance.

The segment level coverage is easily extendable to derivations of Census block level speed. The figure below shows the attributions of block level speed based upon the Maximum Advertised Speed available from a DSLAM. Although the methodology isn't perfect, it does provide insight into the value of granular infrastructure data.

[14]Only TIGER features of MTFCC type S1100 and S1200 were excluded from use.

Over time we have seen an increase in the number of providers submitting this type of data for our use. Our sense is some providers find plant level data easier to generate and are satisfied with the results of derived coverage.


Legend
LastMilePoints
<all other values>
LastMilePoints.MAXADDOWN, LastMilePoints.MAXADUP
3, 2
4, 2
5, 2
6, 3
CBs
<all other values>
MAXADDOWN, MAXADUP
3, 2
4, 2
5, 2
6, 3

Coverage Derivation Using Polygon/Polyline Serving Areas

Broadband service providers sometimes submitted coverage in terms of served areas. This was either in direct geospatial formats, CAD files, or paper maps. The image below reflects a carrier's service area. Within that service area, there are variations in technology of transmission and served speeds. When polygons with speed data and technology of transmission were available, we used a spatial intersection to gather covered Census Blocks. In many cases, using covered Census Blocks resulted in a loss of the speed variation (sometimes the speed variation was at a level smaller than a Block and did not get picked up within a spatial query).

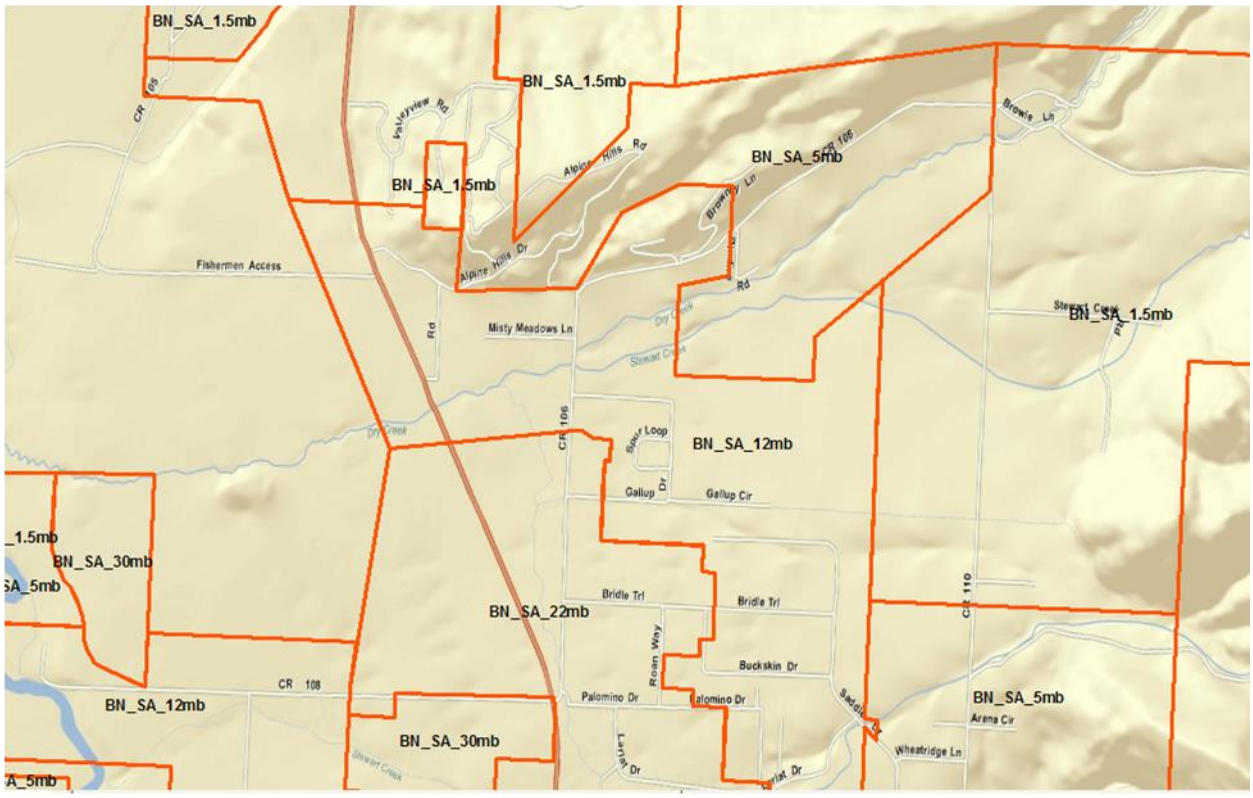


Figure 11-Coverage derived through serving area polygons

Although we cannot directly solve the loss of speed granularity due to Block shapes, we honor a business rule wherein we always select Blocks from the highest speed areas first, and then allow the lower speeds to select from the remaining Blocks. This is an arbitrary rule, but our feeling was that it should be a consistent selection, rather than an unordered selection.

Street Segment Derivation, Large Blocks

For those calculated Blocks greater than 2.00 square miles (large Blocks), we provided coverage in terms of covered street segments and corresponding geography.

With respect to segments we had four sources of data:

1. Covered large Blocks
2. Tabular street segments and address ranges for large Blocks

3. Geographic segments either with street attributes or without
4. Service area boundaries

A few providers only provided a list of covered large Blocks without corresponding segment information beneath the block. This provided the choice of either selecting all segments in the block, or none. Because we had little information from which to make the selection, we elected to be conservative and did NOT pass any covered segments to NTIA from this submission format.

Some Broadband providers submitted covered street names and street ranges. In these cases we performed a manual analysis trying to link to specific segment names and address ranges within covered Blocks. Sometimes this was a simple process because a provider used a TIGER derived street database. In other cases we could not determine the source of the provider's street data. Street and Address matching tended to yield a relatively good result (typically between 30% and 100% of possible segments in the Block), but was very time consuming. Where yield rates were low, our result was a shredded

segment coverage pattern, like the image shown below.[15]

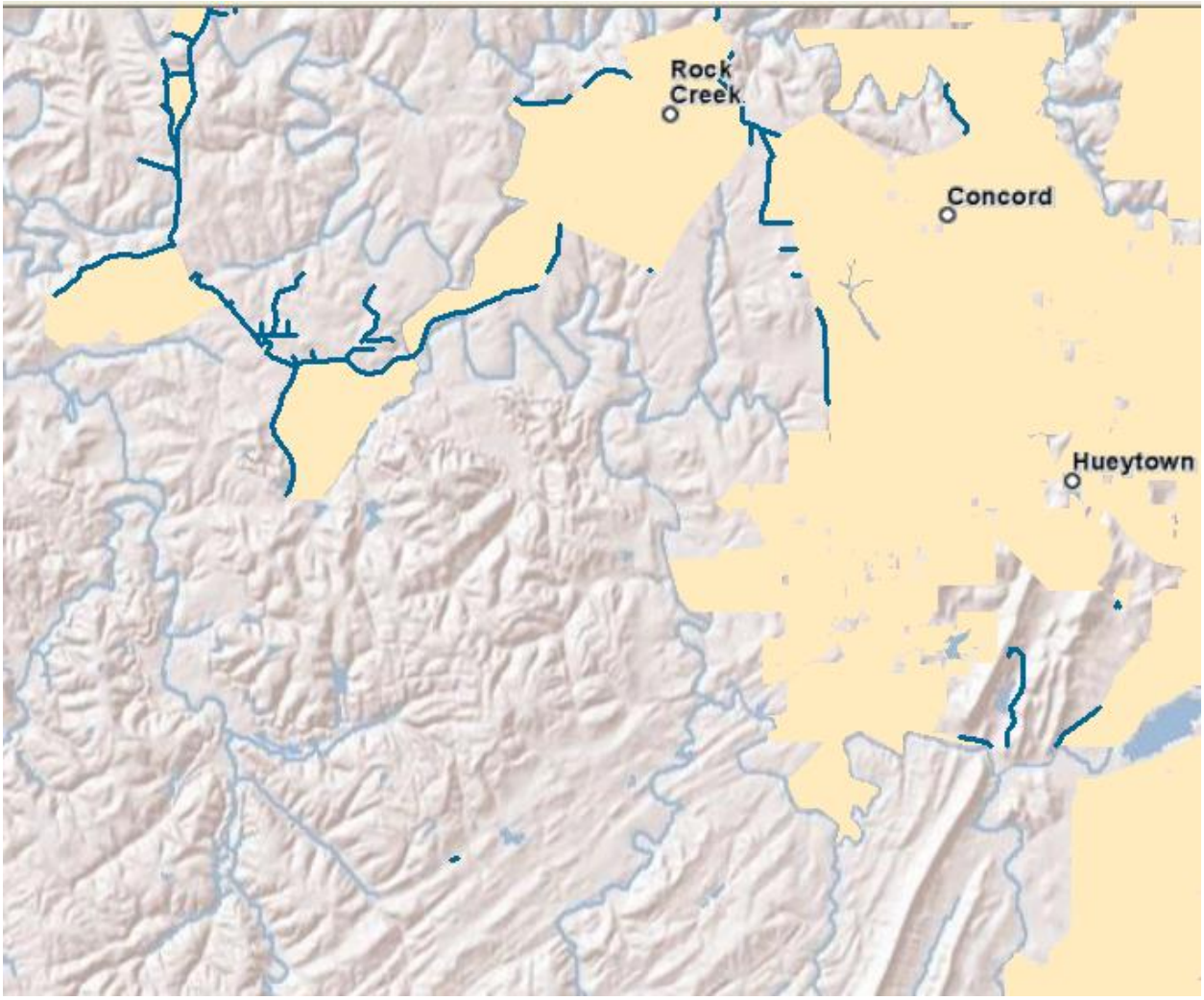


Figure 12-Blue road segments adjacent to peach covered small Blocks

A number of providers submitted geographic objects. In this case, our manual process was directed toward a conflation of data sources. The goal was to take provider submitted segments and put these segments in terms of our TIGER 2010 basemap. Although there is a trade-off in the accuracy using non-provider submitted segments, we felt it was more important to have a license-free road set that would edgematch our Block features, the TIGER state boundary and remain consistent with the block size standards we used for other providers. This is important for the appearance of the online maps, as well as potential verification work where we are attempting to judge a feature based upon its attachment to a covered small Census block. The figure below shows street segment input data.

[15] We continue to hear providers expressing concern that our request for either a geographic object or TIGER Line ID is beyond the scope of the NOFA clarification. Therefore, they cannot supply additional information to us.

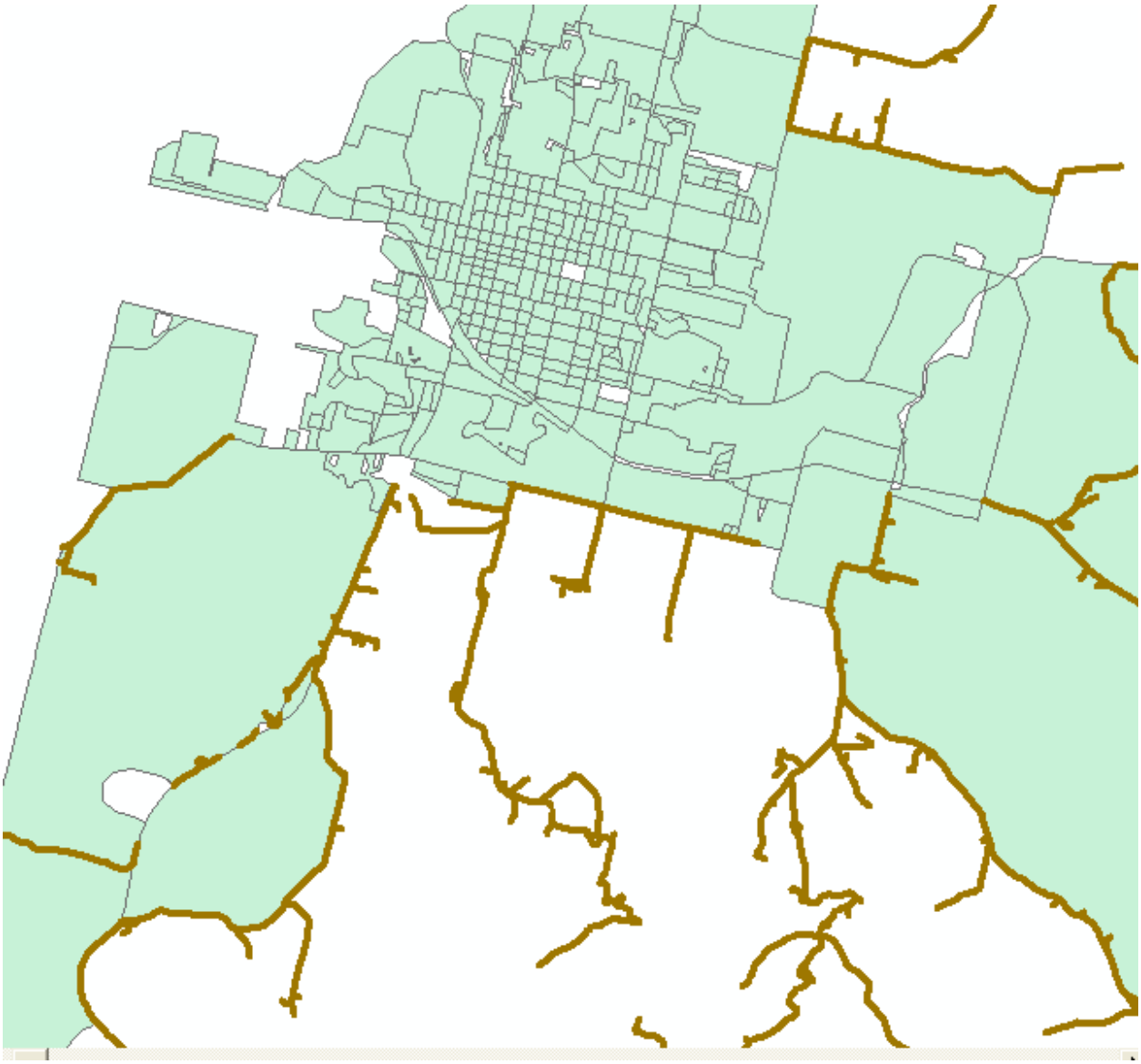


Figure 13-provider Submitted Street Segment Objects. The segments don't edge match the Blocks nor are they continuous.

The figure following demonstrates the same area after the conflation process. Blue segments are the conflated TIGER roads which will be passed to NTIA.

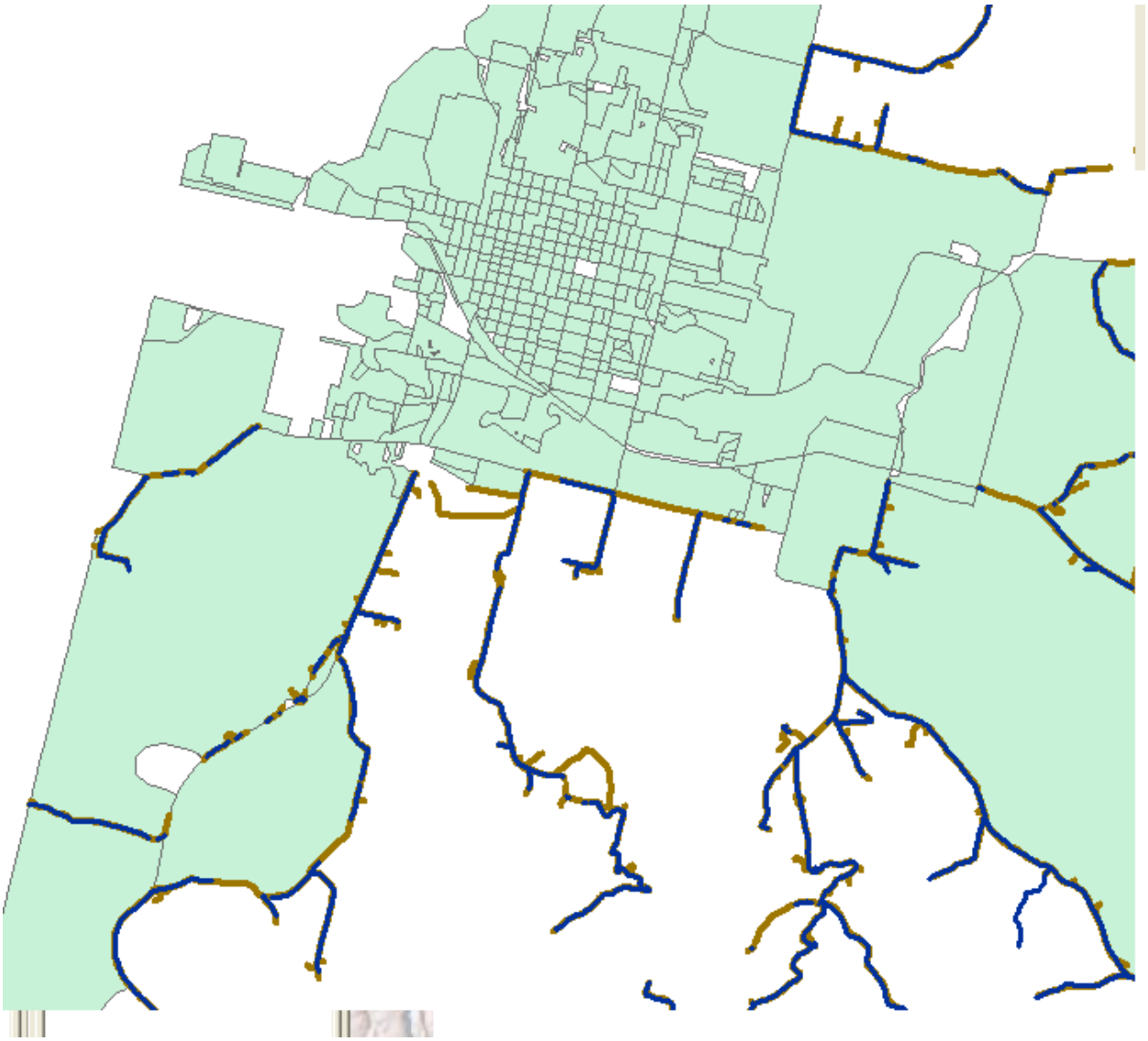


Figure 14-provider submitted segments in gold, selected TIGER in blue—Conflation result; in many cases what was a continuous segment is made discontinuous because even with a distance buffer the TIGER segment doesn't always intersect the provider segment

The final segment process was used when we were supplied with a Broadband covered area polygon. In this case, we found the segments within covered areas and eliminated those segments inside of Blocks less than or equal to 2.00 square miles.

Because there was more control over the format of the inputs (we knew we had a boundary and were working with TIGER segments), this was an automated process that followed this general format:

- Select large covered Blocks by provider ID (from updated Large Block table)
- Select TIGER 2010 road segments (MTFCC like 'S%') that face (CB = CBLeft2010 or CB = CBRight2010) covered large Blocks for provider

- Select segments as distinct records, max speed with corresponding technology, join in feature names, export selected records to temporary DBMS table
- Join TIGER roads feature class to temporary table on TLID
- Select covered segments (Python script)
- Select service area polygons for provider
- Clip selected facing segments with selected service area
- Export clipped segments to staging feature class, keyed by providerID

In this figure, orange represents covered small Blocks; black lines are covered segments in large Census Blocks (light blue). The service area boundary is shown in grey. Based upon feedback from providers, we have elected to clip segments at the end of a coverage boundary.[16]

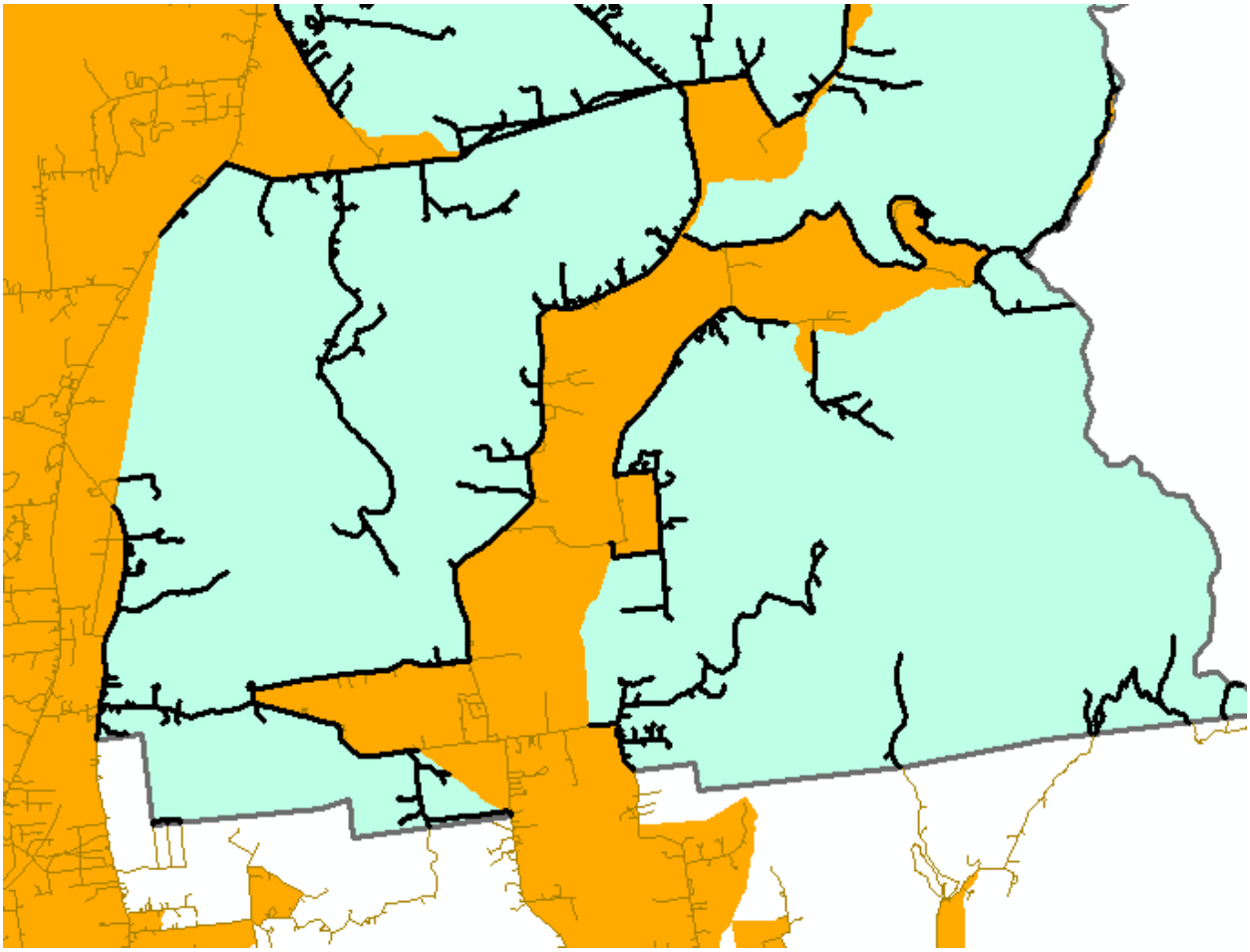


Figure 15-Output of the Segment Process

Wireless Coverage Process

In general, most providers of mobile Broadband submitted coverage information in a NOFA-compliant format. Other than attributions for spectrum and speed, little was done to this coverage.[17]

[16] An outcome not discussed here is how to handle address ranges on segments. As NTIA has asked for a Min and Max on the segment, deriving theses values for clipped segments is very problematic. Also the prevalence of alphabetic characters in addresses makes the min/max selections very arbitrary. We are grateful that addresses are nullable data elements.

Per Program Office direction, LinkAMERICA followed up with wireless providers where we determined that submitted data did not edgematch TIGER 2010 state boundaries. For the most part providers were unable to submit coverage data that edgedmatched as requested. In this case, we left the submitted data alone and did not perform any adjustments.

For providers who clip lower speeds out of higher speed coverage areas, we follow up and attempt to get revised coverage data.

LinkAMERICA continues to make aggressive efforts to bring additional WISP coverage into the NTIA dataset. For the most part, our outreach was with providers who were unable to supply sufficiently granular data in the past or those that could only submit wireless address points which is no longer a valid submission format. As stated earlier, we also work with third party service providers to getter coverage information.

Fixed wireless providers generally either supplied coverage information or infrastructure from which coverage estimates could be derived. Many allowed us to use their tower locations, antenna heights and direction/spread of coverage to derive a line of sight coverage estimate. In our experience, this is a conservative and reasonable derivation of coverage.

Some wireless providers submitted RF propagation studies. When this was done, there was a request that the signal strength be removed from coverage data. The request was honored. We note that some providers are very careful in that their coverage is an estimate of the probability of receiving an upstream link to their network. It is not intended as a depiction of any particular speed availability.

Other fixed providers were able to supply us with hand drawn maps or polygons/polylines drawn in Google Earth format. In these cases we did our best to georeference and verify the coverage areas with the WISP.

When we received coverage information in KML format, like the image below, we accepted the data as it was presented to us as the submitted coverage patterns were used in the provider advertising.

[17] Some polygon data did exceed the node count threshold. In these cases, data was rasterized to 100m cells and then converted back to polygons. The polygons were dissolved to multi-part geometry. This addressed the node count concern.

As the image above shows, in some cases we were provided hand-drawn coverage, as well as infrastructure. Instead of estimating their coverage using a line of sight or RF study, we elected to stick with the provider's supplied information. Our decision was guided by two primary factors:

If the provider is advertising using this coverage they must have specific confidence in its accuracy. If the provider can supply coverage, as well as infrastructure that reasonably supports the coverage, there is a very high likelihood in the accuracy of the information. Second the use of this coverage pattern provides an objective standard to verify against.

The downside, of course, is the polygon shown on the map may not represent our notion of how wireless coverage should appear.

In general we note several interesting trends in the wireless data. First, we can be successful in increasing the amount of WISP coverage when we aggressively pursue WISPs. This means we have to be willing to accept data on their terms and convey it into SBI formats. Some of our WISP submissions have taken over 12 hours to normalize into SBI formats. Second, we have to accept that some WISPs will not be able to supply FRNs. Third, there appears to be some variation on how the NOFA coverage definition is met. In other words, there seems to be a disparity on the necessary link budget necessary (e.g. -80 dB, -98 db, -120 dB, etc) to provide the appropriate quality of service for data services to be provided at a location/inside a location. Fourth it was very difficult getting providers to identify spectra used for

Broadband data services[18]. We are unsure if this is a competitive concern, or if the same coverage pattern is yielded for multiple frequencies. Typically, the spectra returned were those that a provider was licensed for. At this point, we have no reliable way to locally determine what set of frequencies are used to provide Broadband data services in a local area at a specific point in time.

Service Address Point Process

A handful of providers have requested that customer level, service address point data be submitted to NTIA. In these circumstances we have done minimal processing to preserve the provider's intent with this deliverable and not bias downstream NTIA use.

Our verification included checks against commercial or Public Utility/Public Service Commission exchange boundary maps. Points not contained within three miles of a boundary are not submitted to NTIA. The percentage of excluded data varies cross providers, but it tends to be under 1% of the total submission.

We retain from the provider the provided latitude and longitude, as well as Census block. For some coverage data, if a provider is unable to supply a longitude, latitude or Census block, we fill in these attributes. In those circumstances where we do not have a Census block, but we do have a longitude and latitude, we accept the given longitude and latitude and use that as the basis for our Census block assignment.

With point data we have tested for comparable geocoding success rates but do not overwrite provider information.[19] From this type of analysis we note the amount (usually little more than 10%) of addresses that seem to locate with less than street segment certainty. Deriving a thematic representation of the points on speed also illustrates some of the locational certainty issues in this point level data.

Coverage Estimation Process

Although the derivation of Broadband coverage into Census Blocks, street segments, or wireless coverage files is, in itself, a bit of an estimation process, there was an explicit estimation process required in cases where a Broadband provider either refused to participate in our survey, or provided such a threadbare submission that no carrier-based coverage information could be gleaned[20].

We typically resorted to three possible estimation paths.

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[18] One provider responded by email, "This mapping program is to provide the coverage area for Broadband provided by a company. Not to keep a detailed account of every aspect of a companies (sic) network."

[19] We will make a second geocoding pass on locations with no longitude or latitude from provider. We typically pick up ~5% from our second geocoding pass. Typically the issue tends to be address quality but also difficulties in geocoding in very rural areas.

[20] We report estimated submissions to NTIA as a non-responsive provider but we have data in the submission for them. This is the reason for datapackage.xls entries which are non responsive but contain submitted data.

For Cable (HFC) providers who did not provide any coverage information, we fell back to Media Prints data. Rather than using the entire Census Block Group gathered by Media Prints, we used only those Census Designated Places carrying the same or similar names to the Media Prints p_com field. Our reasoning was that Cable systems tend to be franchised on a municipal or at least administrative basis so the coverage will likely follow a governmental boundary. As a general rule, cable infrastructure is not available in the public domain[21] and what could be found was poor in quality and difficult to ascertain for validity.

For DSL providers who did not provide any coverage information, we estimated road-based coverage from their Central Offices[22]. We only used Central Offices that showed evidence of DSL or fiber-based services in the NECA 4 tariff. Road-based engineering areas were derived via ESRI Network Analyst to 18kft. These segments/boundaries were clipped to commercial wirecenter boundary edges.

For fixed wireless providers who provided no coverage information, we relied on their public websites to derive coverage maps. When these maps were available, we georeferenced them and tried to use the outer polygon boundary to represent their serving area. In other cases, when only a tower could be provided, we used a viewshed analysis and estimated line of sight coverage at 10mi per tower[23]. Because much wireless propagation is driven far below the Census Block and much engineering information isn't known (frequency in use, polarization of the signal, coverage pattern of antenna(s), local terrain/land cover) this was the most complicated group to estimate.

For providers who refused to provide spectrum information, we defaulted to unlicensed for Fixe d Wireless and NTIA category 1 for mobile wireless.

Speed

Speed attributes are reported both at the block (typical) and higher levels (maximum advertised and subscriber weighted). We note that in many cases, providers did not supply typical or subscriber-weighted speeds. In some cases, it appears--although we cannot verify--that their maximum advertised speeds were used to populate typical speed columns.

We do have limited testing data on reported speeds, but we have been careful to not use our typical reported values with carrier-provided information. If we do not have a speed value from a provider, we report an empty value.

Several service providers claim they do not have data on typical speeds available, but estimate a 20% overhead factor between the advertised speed and what may be experienced by an end user.

[21] The team tried to use data from the FCC Coals system and 321/325 fillings but this seemed to be a bit non-uniform in quality.

[22] Central Office location was derived from GeoResults. Wirecenter boundaries also came from this commercial product.

[23] In some cases we had an approximate radius of coverage but no height. In this case we used a 50' height estimate and then clipped the coverage to the provided coverage range. We also clipped wireless coverage to honor state boundaries but did not look for providers serving coverage with out of study state facilities.

As a general rule, in circumstances where a provider supplies a range of speed attributes, we assign NTIA categories based upon the midpoint of the range. We follow this rule unless we can determine other grantees are handling the same submitted information differently.

To support NTIA program office requests, we have also modified the structure of the Service Overview table. Even if Maximum Advertised Speed is supplied at the market or county level, we push that speed down to the contained Blocks. The only records that remain in this table, will be those wireline records with either a non NULL nominal weighted speed or ARPU value.

Middle Mile

Middle Mile information was collected directly from providers via survey or interview. Middle Mile is a "chicken or egg" type of challenge in that it is possible to verify that the infrastructure exists, but extremely difficult to know what the site is doing without engineering level assistance. Although most providers submitted "something," there was a significant variance in what that "something" represented.

The purpose of this section is to record some of the comments and questions we have received about Middle Mile. We hope this provides better context for our data submission.

Within the NOFA, Middle Mile was defined as (a) a service provider's network elements (or segments) or (b) between a service provider's network and another provider's network, including the Internet backbone. (Collectively, (a) and (b) are "middle-mile and backbone interconnection points.")[24]

Given the existence of the "or" in this definition, providers submitted a variety of information. Based upon the NOFA example, several fixed wireless providers interpreted Middle Mile in terms of the connection points from their towers to their own serving backhaul location. The topology was commonly Microwave from their distribution towers to their NOC. The NOC and towers were listed as the Middle Mile points. This seems to be consistent with the first definition clause (a).

Telephone, Mobile Wireless, and Cable providers tended to remain either silent on the question, or would provide a single location in which Internet peering occurred (clause b). A number of participants explained that the NOFA was quite ambiguous with data traffic moving back and forth over both TDM and IP networks--it was unclear where the distinction should be drawn. As a general rule it seemed like many providers listed a single location where Internet Peering occurred.

A number of providers refused to answer the question on grounds of confidentiality[25]. Others would not disclose as their Middle Mile points are not owned--another company provides the physical and

[24] From http://broadbandusa.gov/files/BroadbandMappingNOFA(FederalRegisterVersion).pdf at 54, visited March 28, 2010

[25] As received in email 9/30/10, "Due to security concerns and the risk of public disclosure of highly sensitive data, whether inadvertent or otherwise, ***REDACT***response to the Middle Mile and backbone interconnection request is limited to publicly available information available on {remainder not included}"

electronic connection to their network. In other words, the entity providing Broadband is not the entity providing Middle Mile.

Additionally, based upon the new Provider Type classification of "other," we have started to integrate points provided by Broadband service providers not meeting the NOFA definition. This includes POP locations and aggregation points for public / private networks.[26] Within a given submission there were two final attributes that tended to concern respondents. First, speed should be measured in terms of only data capacity and what exactly is "data" (e.g., can/should you segregate out voice or video), and is the relevant capacity of the physical connection, channelized to a specific virtual circuit on their network.

Finally, a number of other providers were unsure of the height above grade measure (is this their floor, the street outside, etc). We seem to have a combination of height above or below grade, as well as heights above mean sea level (AMSL).

To the extent possible in our timeframe, we verified the location of a sample of Middle Mile points. Where we could see infrastructure that appeared to be consistent in location with other provider infrastructure, we felt that the location was accurate. In some cases, the point provided seems sensible (is on a road, near other equipment), but using imagery, we couldn't find a place where this type of connection could occur. This wouldn't be unforeseen, in that Middle Mile connectivity likely takes place in a protected environment much smaller than a standard Central Office installation.

Mobile Wireless Coverage

We have received mobile wireless coverage from most mobile Broadband providers in each state. At this point we have cleaned the geometry of the data and attributed it with spectra, NTIA speed categories and FRN as required.

Where possible, provider derived coverage has been reviewed for consistency against the commercial licensed product. To a limited extent we also use licensing locations and tower infrastructure to spot-check supplied coverage. This mode of verification remains complex, given the lack of facility-based information with mobile wireless.

Finally with respect to mobile Broadband services, we note several trends.

First LinkAMERICA used the NTIA supplied frequency tables to report speeds consistent with other grantees. In circumstances where a provider supplied a range of experienced speeds, we used the portion of the range consistent with the most frequently reported Grantee value.

Second where a provider reports multiple frequency bands in use but doesn't distinguish these bands by submitted SHP file, we submit identical geometries but attribute one geometry to each submitted spectrum value.

[26] As discussed in our readme.txt file, a number of middle mile points were lost in validation due to their location in adjacent state. This will cause a decrease in some providers relative to prior submission.

Third we are seeing a trend toward increasing Broadband speed. As of this writing, there is not consistency across providers in how they attribute the advertised 4G speed values. In other words, for some providers 4G means advertised speed categories increase. For other providers the speed value did not change.

Fourth, we have requested providers submit SHP files that are consistent with the TIGER 2010 boundaries. For the most part, providers have not done this. We have not modified the submitted data to impose the TIGER 2010 state boundary.

Verification

Data verification is an ongoing and evolving process. Clearly, with each new data submission there will be a validation process at hand and at the same time, our team continues to expand and improve the efficiency and effectiveness of our data verification routines. Consistent with the movement toward an fGDB export database and use of a data receipt script, much of our validation effort is spent in supporting the ETL processes into the required formats. In future data submissions we will continue our work to stabilize and improve the business process that normalizes provider submissions into NOFA formats.

Verification Methods Summary

Our overall verification standard is focused on the level at which we supply processed data to NTIA. This means that the vast majority of our verification process and resources will be focused on verifying provider identity, coverage, advertised speed and appropriate metadata for Census block's less than or equal to 2 square miles.

We believe three broad verification themes are important to consider

a) The first step of broadband service verification is a consistently applied market definition—we call this provider identity verification.

b) There is probably not a single dispositive method of verification. Rather, a number of verification approaches are needed to appropriately classify confidence in data submitted to NTIA.

c) Verification approaches tend to meld together. As an example a web survey is complimented by a phone survey but expert review and external data may be necessary to reach a final informed judgment.

The table below demonstrates the various methods used across each feature class submitted to NTIA.

	Data Types			
Verification Method	**Census Block, Road segment or, address specific service**	**Mobile wireless service availability**	**Middle mile infrastructure locations**	**Community anchor institutions**

	availability			
Provide/Subscriber Identity Verification	METHOD USED	METHOD USED	METHOD USED	METHOD USED
Internal data consistency check	METHOD USED	METHOD USED	METHOD USED	METHOD USED
External data consistency checks	METHOD USED	METHOD USED		
Carrier confirmation	METHOD USED	METHOD USED	METHOD USED	
Public review	METHOD USED	METHOD USED		METHOD USED
Anchor institution review				METHOD USED
Expert review	METHOD USED	METHOD USED	METHOD USED	METHOD USED
Telephone sampling				METHOD USED
Purchased Datasets	METHOD USED	METHOD USED	METHOD USED	METHOD USED
Developed Datasets	METHOD USED			
Web-based surveys	METHOD USED	METHOD USED		METHOD USED
Field Surveys	METHOD USED	METHOD USED		METHOD USED

The following table defines each of these methods and provides a summary of why this method is used, and the value we gain from it.

	Definition	**Methodology**	**Purpose**	**Benefit**
Provider Verification	Provider verification is the process of assembling a	Provider verification involves combining multiple data sources,	Without a consistent understanding of the provider	The main benefit of this verification process is understanding who is providing broadband

	broadband provider database, determining which providers are properly classified into SBI eligible providers and developing contact information.	interviewing providers and classifying the broadband provider type.	'market' it is impossible to appropriately classify the coverage data. It is also impossible to explain to consumers of the data why a given provider is or isn't available in the submitted data.	services, are the broadband services NTIA compliant and how do you 'contact' this provider (Name, DBA, FRN, Holding Company)
Internal data consistency check	An internal data consistency check is a validation measure across at least two dimensions. First is the provider data consistent with prior submissions. This would be an examination of this submission relative to a prior submission. Second is this submission consistent with the technical specifications of the service offered.	Most of this validation is performed using our spatial databases and running queries that compare submissions. We also use a similar set of queries to isolate transmission of technology outliers. These would be data sets which offer speed technology combinations which are unusual relative to other data received across all states.	The purpose of this type of validation is to understand how things change over time and why. It also helps inform us for circumstances where we have data points which appear to be outside of the norm. If these outliers are detected, they can be pursued directly with the provider.	The main value is understanding why something changes and providing an opportunity to engage with the provider to understand why there has been a change.
External data consistency	An external data consistency check is a measure of	External validation can be performed by verifying	We don't believe a single,	External validation provides an external measure of data quality

checks	the provider data against external sources (not from the Provider). The distinction between internal and external isn't pure, but our typical experience has been that External checks involve the acquisition of additional data sets and a comparison across multiple sets.	supplied coverage against third party data sources. An example would be to test provider claimed DSL Census blocks against a commercial source of exchange boundaries. Wireless coverage is also compared to radio locations.	exhaustive third party data set is available for validation. We do believe a combination of external datasets can be used to inform and help filter out the false positive cases from provider data. We also note that the external data appears to diminish in accuracy as the area of analysis becomes less urban.	assessment not influenced by internal data sources. It can be one of the more effective means of isolating false positives in submitted data.
Carrier confirmation	Carrier confirmation is the process of sending processed data back to the service provider to ensure that translation into NTIA formats is fair and appropriately accurate.	We use two techniques to accomplish this. First a provider's data is summarized in a tabular format. This lets the provider quickly verify firm information (FRNs, DBAs, counties served). We also develop two sets of check maps. One is a PDF version and the second is a	One of the more critical steps in broadband mapping is translating carrier supplied data into NTIA formats. Providing verification deliverables to the service provider (carrier) is an	Carrier confirmation gives the provider information on how their data will look when submitted to NTIA. It also helps short circuit complex problems like online map display problems—which tend to come from FRN issues or incorrect data entry. This process also helps to strengthen the sense of ownership and participation with

		Google Earth (KMZ) version. Both versions display the NTIA reported coverage and speed. A different map is developed for each technology of transmission	important external feedback process. Several providers also ask us to repeat this process before data are submitted to NTIA so they can see what will be submitted to NTIA.	providers.
Public review	Public review is the process of collecting structured feedback from the general public in a manner which can be analyzed and used to improve/validate the submitted data.	Currently we use an online map 'layer' which provides consumers the ability to feedback about the coverage and provide in depth information about their concerns. The maps are also discussed within the context of planning teams within each state. We receive feedback from these meetings.	As with other crowd-source approaches the intent is to allow the general public to feedback and improve the displayed and submitted data.	The benefit is to provide feedback and also display the comments of the general public. As a mechanism for validation the key is to develop feedback data which is structured in way that informs the mapping process.
Anchor institution review	Anchor institution review is targeted surveys intended to better understand the Anchor Institution	We have used three methods to verify anchor institution data. The first is a targeted series of	As Anchor Institutions represent a different class of coverage information as	Because CAIs represent a very distinct stakeholder community, building identifiable connections between the SBI program and the anchor

	broadband market.	telephone calls. The second is specifically targeted mailers. The third is direct interviews with stakeholders. Schools for example, may have someone at the state level who maintains information about broadband connectivity.	well as a very different type of end user, a focused stakeholder management, data acquisition and data review process is advantageous.	institution community is important. Tailoring a specific data acquisition/ data review process helps Anchor Institutions establish a reliable set of infrastructure benchmarks which they can use to fulfill their mission.
Expert review	Expert review is the process of using subject matter experts to review submitted or processed provider data.	The method of subject matter review will be dependent upon the type of data in question. In the past this has taken the form of conversing with a wireless engineer to ensure that the coverage pattern appears plausible for a given technology. It may also involve a cross check on data from a second source—can this type of middle mile infrastructure support the maximum advertised speeds in this area? SME validation is also helpful trying to	The purpose of expert review is to get a second opinion regarding some aspect of submitted or processed data. Given the large number of submission formats and innovative ways to supply broadband, it is always helpful to have multiple sets of eyes available to reduce errors from misunderstanding.	The most significant benefit is to have a secondary source for back checks and verification. For the most part expert review is from an engineering or deployment resource. Expert review also helps support process transparency so there isn't a closed GIS driven process making all the decisions.

		understand ambiguous information in submissions.		
Telephone sampling	Telephone sampling is the process of using targeted phone calls to verify aspects of submitted or processed data.	Telephone methodology tends to be consistent across the type of data being verified. A subject location or individual is identified. The phone number for that location is identified and a call is placed. The person performing the survey asks a scripted set of questions and records the responses in a database. For example, our team produces a survey to develop and monitor access and use trends at a regional level.	The purpose of a telephone survey is to gather in depth information from a targeted respondent. We would likely use telephone survey for targeted purposes--either clarifying anchor institution data or randomly polling consumers to better understand attitudes.	The primary benefits are to develop in depth information as well as surveying a large number of respondents regarding opinions or behavior. Phone surveys tend to be more helpful to survey attitudes or to find out location specific information. Telephone sampling is used in our CAI and consumer surveys.
Purchased Datasets	See external data consistency checks.			Also note that not all external data checks must be purchased. For example Census data could be used for an external consistency check but it is freely available for download.
Web-based	Web based	In the case where a	The purpose in	The benefits of web

surveys	surveys can involve three dimensions. First a web survey (a form available to be filled out on the Internet) can be used to supplement and better understand consumers. A web survey could be a compliment or a substitute for a telephone survey to target a specific demographic (a web survey can also be part of a social media campaign). Further web surveys can be used to verify provider information.	web survey is a compliment to phone or in person, a survey instrument is developed and then respondents are invited to complete the form. In the case where a survey is a mechanism to gather additional information from provider web sites, this could take the form of manual queries (looking for address listed in a Census block) or automated scraping where information is pulled from a website via a specific web application. We currently use both approaches depending on our goal.	all cases is to gather additional information via the Web.	survey are its relatively low cost as well as the ability to gather specific information into a form that can be easily used by downstream work processes.
Field Surveys	A field survey is sending a team of skilled participants into the field to verify submitted data or sample some aspect of the environment in a given area.	Field survey methods involve assigning a field team, equipping them with data acquisition hardware, ensuring they have a consistent skill basis and recording	Although expensive, field surveys are sometimes the best way to verify information such as provider equipment	The benefits to field work are significant. They can help us better understand the exact phenomenon in a particular area.

	observations. To date most of our field survey work has been in engaging CAIs into the process. In Q2 of year 4 we are preparing to launch an app for download to mobile devices with the intent of testing mobile wireless speed and access.	presence or the strength of a wireless broadband signal.

Verification Standard

Verification is a broad term, but in our definition it boils down to determining if broadband coverage is in the right place. For a given provider, the question is whether the coverage is assigned to appropriate Census Blocks, road segments or area features. Coverage verification can be further broken out into two distinct classes:

Technology verification, which is determining if the provider is listed with a technology consistent with their marketing information.
Speed verification, which is determining if the speed supplied for that block, road segment, point area file or market area is consistent with the technology and the marketing information received.

The final verification dimension is consumer feedback and crowd-source verification. This is a dynamic set of steps we are beginning to implement. One side of this is responding to consumer concerns. The second is using the crowd sourced data to validate provider claims and, if appropriate, update the map and the underlying data.

At this stage, our working hypothesis (confirmed by our experience) is that there will not be a single measure to indicate broadband coverage availability in a Census block or along a segment. From prior work, and examining our current provider submissions, we believe that there is too much variation below the submitted record to make a single binary yes/no indication. Rather, there will be a series of measures that combine to provide qualitative confidence (a classification scheme) in our indication of Broadband availability at the block, segment, or wireless polygon level. We believe such a qualitative classification scheme is both relevant to and supportive of NTIA interests, as well as the interests of our end-user community – that is, the states and citizens we serve through this program.

The intent of this section is to illustrate why our team is moving toward a particular verification methodology. Our team is learning as we go along, and will adjust and improve this thinking. But given our experience to date, this is our path. As stated above:

First, coverage verification is at the level of data submitted to NTIA.
Second, coverage verification is enhanced when there is a secondary measure of availability (such as infrastructure presence or serving area boundaries)
Third, given the limited resources of this effort, the most important coverage verification process to implement is the erroneous dispersion of coverage. These are the "islands" of coverage isolated by significant distance from other covered areas. In other words, Broadband Internet likely doesn't exist far away from other areas with Broadband Internet access supplied by the same provider.
Next we present several examples which illustrate the complexity of coverage verification.

The first example is taken from a gentleman who requested a map change in Alabama. His home is near the yellow dot. The darker grey Blocks are covered Census Blocks. The black lines are covered road segments. He cannot receive DSL from his incumbent provider, although his neighbors can. The incumbent carrier does have at least one structure in that block from which Broadband services can be provided; unfortunately his home is not served.

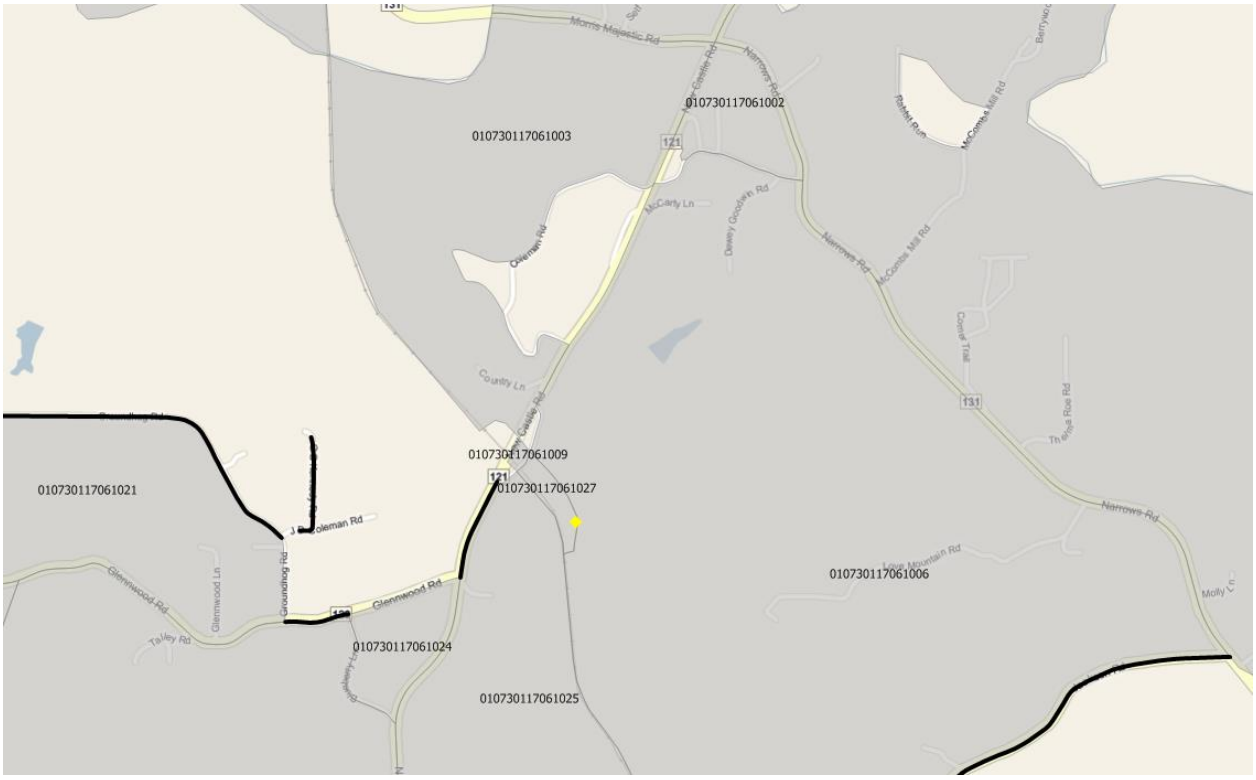


Figure 16--Sub block variation

Because the SBI program requires the depiction of coverage at the block level, the above map has been correctly generated. However, from the customer's point of view, the map is inaccurate. This requires

us to explain that the maps are not intended to be a structure-level qualification, at which point some consumers question the value of the maps when seeking service information.

Beyond this type of one-off structure-level qualification, sometimes, as shown below, we have even larger gaps in provided coverage. The image here shows an "outlier" block that could be an error, or it could indicate missing Blocks along a major road that should have been filled in. In this figure, the outlier block is highlighted in turquoise.

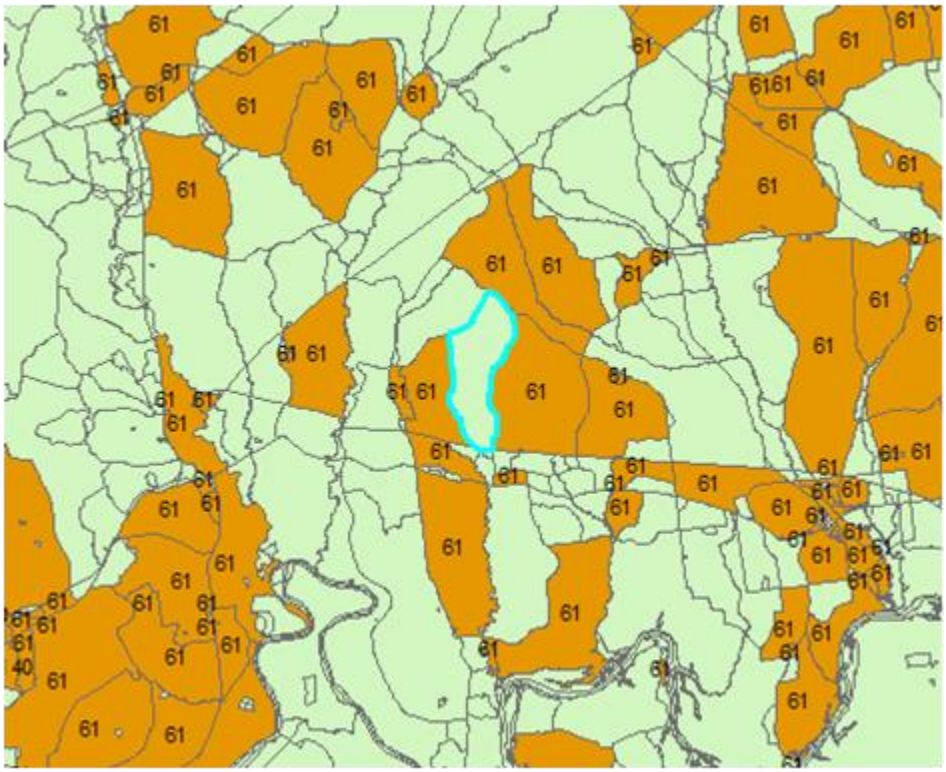


Figure 17--Dispersion in Submitted Data

In this particular case, we are faced with a different verification question. Based upon the properties of the neighbors, we believe this block should likely be covered (coverage interpolation,) but supplied data from the incumbent says otherwise. Although we don't have information to know how much of the data submitted to us is generated, our sense is that geocoded customers or plant are used. In this case the block dispersion could be the result of a side of the street assignment rather than an availability assignment. In other words the data may speak to where is working plant rather than where could service be provided in 7 to 10 days.

The next example shows where an interpolation process could require some adjustment. The figure below shows a town level view. There are some smaller Blocks that are likely covered by interpolation logic, but we also do not want to extend coverage beyond a franchise boundary as in the areas shown in a box on the bottom of the map.

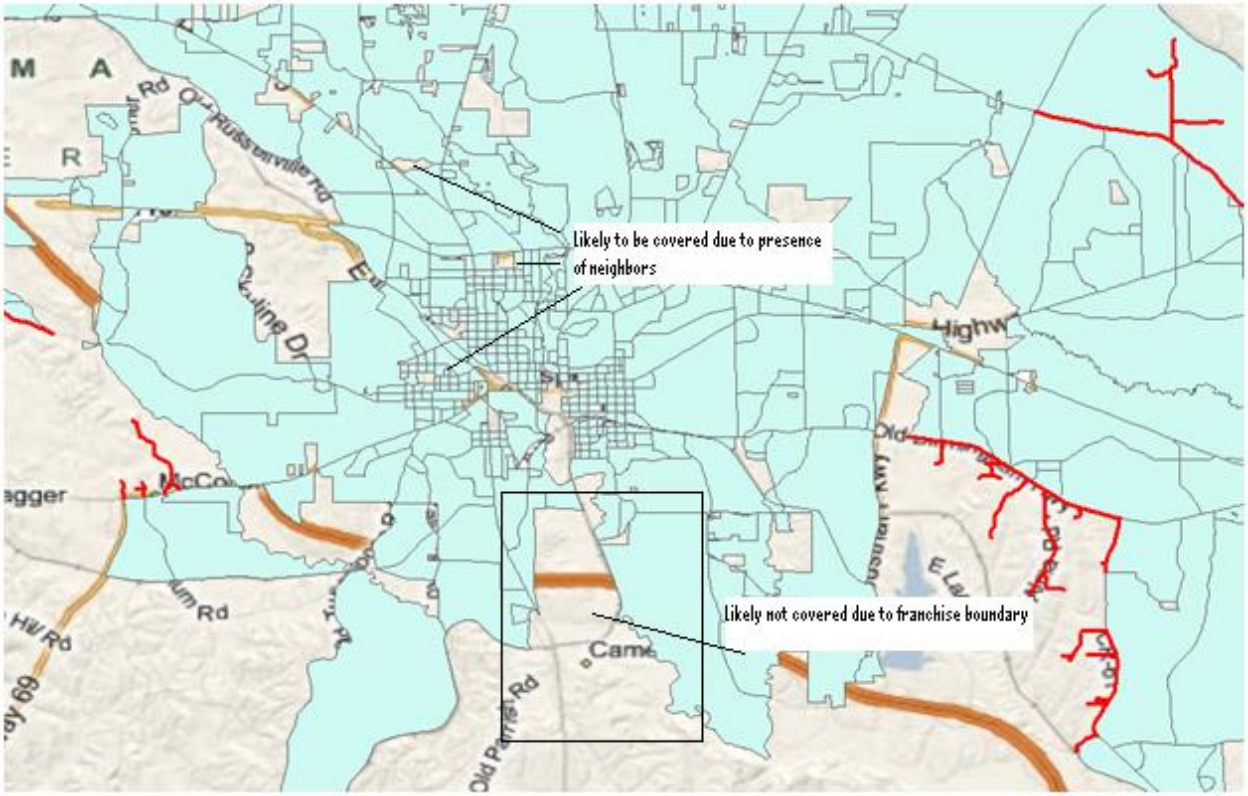


Figure 18-Where do you stop interpolating?

From what we can gather from some providers, the submitted data—data with consistently high degrees of dispersion or coverage holes—tends to come from geocoded billing records. In this paradigm, this means where there are no billing address points; service is not identified on a map. The interpolation verification question then takes on three dimensions.

First, if a provider has no customers in an area, how can we know if they would be able to provide service in a 7-10 day interval?

Second, if we use the properties of neighboring Blocks to interpolate coverage, when should we stop (e.g., at a franchise boundary, at a certain distance, etc.)?

Third, if we are comparing to a data source that examines coverage at a higher level (such as 477 Tract) do we use the Tract information to assign information block level coverage or do we use the tract coverage to filter out dispersions in coverage?

We continue to work with providers to get additional information to help us better understand and contend with this type of circumstance. However, we have not been entirely successful at getting franchise/service area boundaries that would address much of the issue.

The final map shows this dispersion problem, but to an even larger degree. This solitary large block is likely the result of a bad geocode, but we don't know, given the data that has been submitted by the provider and the "single customer in a block standard" set by the NOFA clarification.

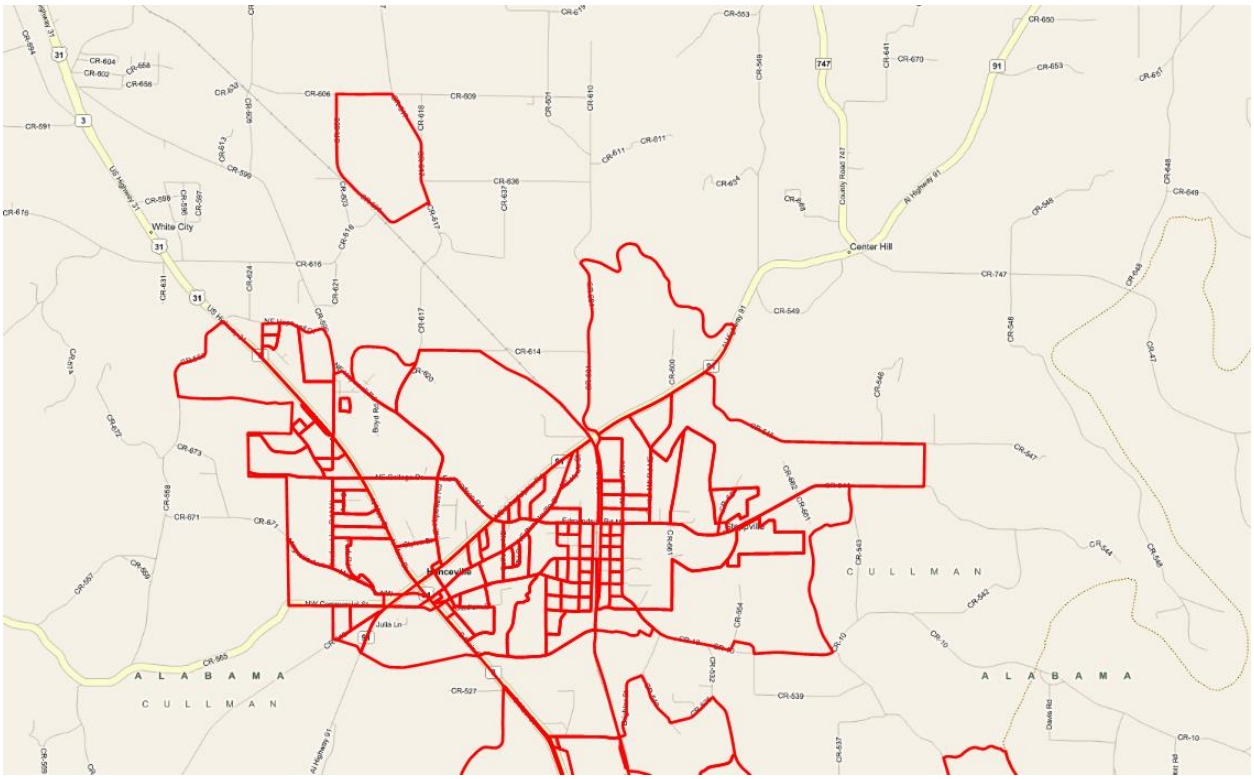


Figure 19-Dispersion in covered Blocks

Due to the fact that this situation is quite obvious in display, this type of problem is one that we are more aggressively trying to resolve. Where a single block has no neighbor offering comparable coverage and is a specified distance beyond an exchange boundary, our approach has been to filter these Blocks out. As of now, this filter is limited to incumbent xDSL providers because we have a good source of exchange boundaries.

The exchange boundary dispersion verification method breaks down when examining providers who are more likely to CLEC into neighboring territory. In the figure below, the black line represents the exchange boundary, while the continuity in the DSLAMs likely points to coverage extending along a road into another provider's territory.

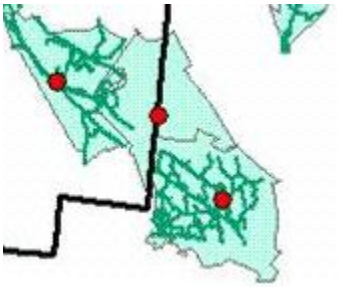


Figure 20--DSL Coverage outside of exchange boundary

In sum, the variability in our source data continues to suggest that our dynamic verification process is relevant, appropriate and evolving in a manner consistent with the overall program. And, as noted above, we believe the more meaningful outcome of our verification processes will likely be a series of qualitative indicators or expressed confidence levels. Our concern, as with the development of any sort of classification process, is how rigid we should make this classification given the variation in our input data and the varied perceptions of service providers, map viewers and down-stream data consumers.

Verification Work Process

To support our dynamic multi-factor verification process, we have implemented the following steps.

Between submissions our provider relations team works to analyze our current broadband provider ecosystem and capture any changes such as acquisitions, mergers or cessation of operations. They also remain in touch with providers who have indicated when follow-up is necessary. The team confirms that the providers who submit data are NOFA compliant. Given these steps they begin a survey and awareness campaign to get data submitted for the program.

When data is received, an analyst reviews the submission and any immediate questions or concerns are sent back to the provider as quickly as possible. We have found this gatekeeping step very helpful in making sure we understand the intent of the submission.

For all providers who submitted data to us in the prior round, the provider received both a tabular data summary and mapped output[27]. Prior to releasing the "check maps" to providers, we inspected each provider's coverage area. After this in-house review, we solicited a second level of feedback from providers and received a number of requested changes and corrections used in the development of the current dataset.

For those providers who submit only block or segment level coverage (i.e., in those cases where we have no infrastructure to test with) we test for coverage containment within known service boundaries. The intent of this validation step is to remove Blocks that are obviously erroneous.

We have also begun to perform a mechanical test against wireline providers. This is an examination to ensure that each feature submitted has some neighbor within 1 mile. We are testing this process to try to understand what the neighbor distance should be. This has proven to be a difficult process.

We also verify the submitted speeds against the typical speed ranges in the NTIA frequency tables. If we note a value outside of typical range, we ask the provider for clarification. These responses are recorded.

As mentioned in the sections above, we have implemented a check on dispersed Blocks, but we have implemented less with respect to coverage interpolation (holes in coverage). We continue to work on a

[27] For the verification of round 3 data, we submitted both PDF and KMZ (Google Earth) format check maps. Some providers prefer to work with the Google format as it supports easier modification. Others continue to submit marked up PDFs.

series of mechanical tools to assist with the inspection process but have run into challenges related to geographic basemap and timing.

As our submissions have moved online, we have also begun to benefit from crowd source feedback. In some cases this has helped us identify and fix errors in our underlying data. In other cases, as we have shared with NTIA, we have encountered some perceptual issues rooted in how the data are developed and modeled to comply with the NOFA. Depiction of uniform coverage in Census Blocks continues to be a challenge. Despite our best efforts to explain the full block coverage requirement, we continue to receive complaints that the coverage shown on the map is not accurate for a particular location within that block.

Cross Submission Validation

As part of our validation process, we compare submitted data from the current submission to the submission prior. This is an automated review in that all providers are examined in terms of submitted record counts and count/technology/speed combinations.

Sprint	**1**	**2**
80	**1**	**2**
3	1	1
6		1
StarBand Communications, Inc.	**1**	**1**
60	**1**	**1**
4	1	1
Starlite Computers	**1**	**1**
70	**1**	**1**
5	1	1
TDS	**27884**	**27716**
10	**27878**	**27716**
3	6219	4538
4	1761	2036
5	8778	8767
6	833	899
7	9023	10368
8	1264	1108
50	**6**	
8	6	
TEC - Cherokee Division	**1828**	**2012**
10	**1239**	**1352**
5	426	479
6	212	314

Our team reviews the changes to make sure the scale of the change is consistent with our expectations given modified survey data.

We then take a second pass at the same submission summary data to review any providers who will be flagged by the submission script. Again this comparison is made between the current and prior submission.

A	B	C	D	E	F
DBAName	TRANSTEC	MAXADDC	Round	RcdCnt	Lyr
AT&T Mobility LLC	80	7	7	1	WR
AT&T Wisconsin	10	7	6	33911	CB
AT&T Wisconsin	10	7	6	45	SG
AT&T Wisconsin	10	7	7	38	SG
AT&T Wisconsin	10	7	7	34213	CB

This second pass helps us to prepare documentation for our readme.txt file. It also helps us monitor where there have been large speed changes by provider. Where we do see changes , we contact the provider to understand how the networks in place support the speed reported. We also cross check advertising materials to make sure the reported speed is being actively marketed.

Consumer and Provider Responses to Deliverables

Here, we segue from internal verification to external verification. We view responses to our work product as a form of validation and verification. On the one hand, this gives us the opportunity to fix mistakes and then generate QA steps to make sure that the problem does not reoccur. We also learn how to improve what we are doing or better explain what we are doing to a community not always familiar with the NOFA and program office framework. On the other hand, listening and learning from this feedback helps us better target our mapping deliverable to meet the needs of our external customers. In this second case, external feedback not only provides feedback on perceived qualities (or lack of quality) in the data, it helps us to learn if we are developing data that is truly helpful to downstream users across a wide range of usage and intent.

At this point, our external deliverables take three forms: State Broadband Maps, data transfer to NTIA used for the National Broadband Map, and text format data requested by outside parties.

Online Map Experiences

With our State maps online, we continue to harvest viewer feedback and comments. Because an online map allows someone to zoom in far below the scale of the data, comments reflect sub-Census block concerns. While important to the citizens reporting these issues and to our Broadband planning teams, this level of data is outside the scope of our core validation process, which as noted above, is focused on the level of data submitted to NTIA.

There are several other themes that our team believes are important to share. These comments are actually quite helpful because they also improve our data processes to better meet the needs of map viewers. For example, we have invested significant time in harvesting more segments from provider data. Because the appearance of segments is so important, we are putting time into ensuring a visually appropriate edge match between the roads we harvest and the Blocks/roads we will show online. On a

technical level, we also believe that a good segment process will help us understand more about dispersion in the data, and what is valid versus what is not valid.

Our team reviews the online comments on a periodic basis.

Online Display of Consumer Feedback

We have completed development of a consumer feedback layer for our online maps.

The intent of the new layer is to show viewers the feedback of other map viewers. This layer went live after the Round 4 data was posted.

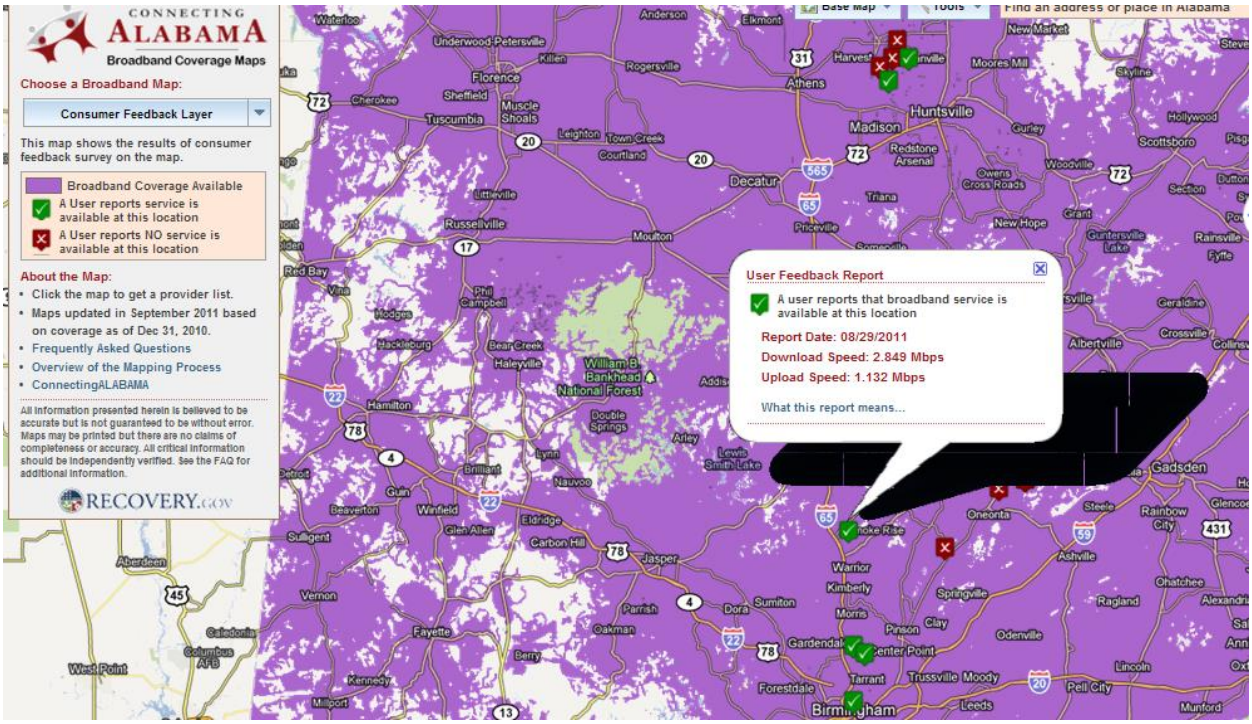
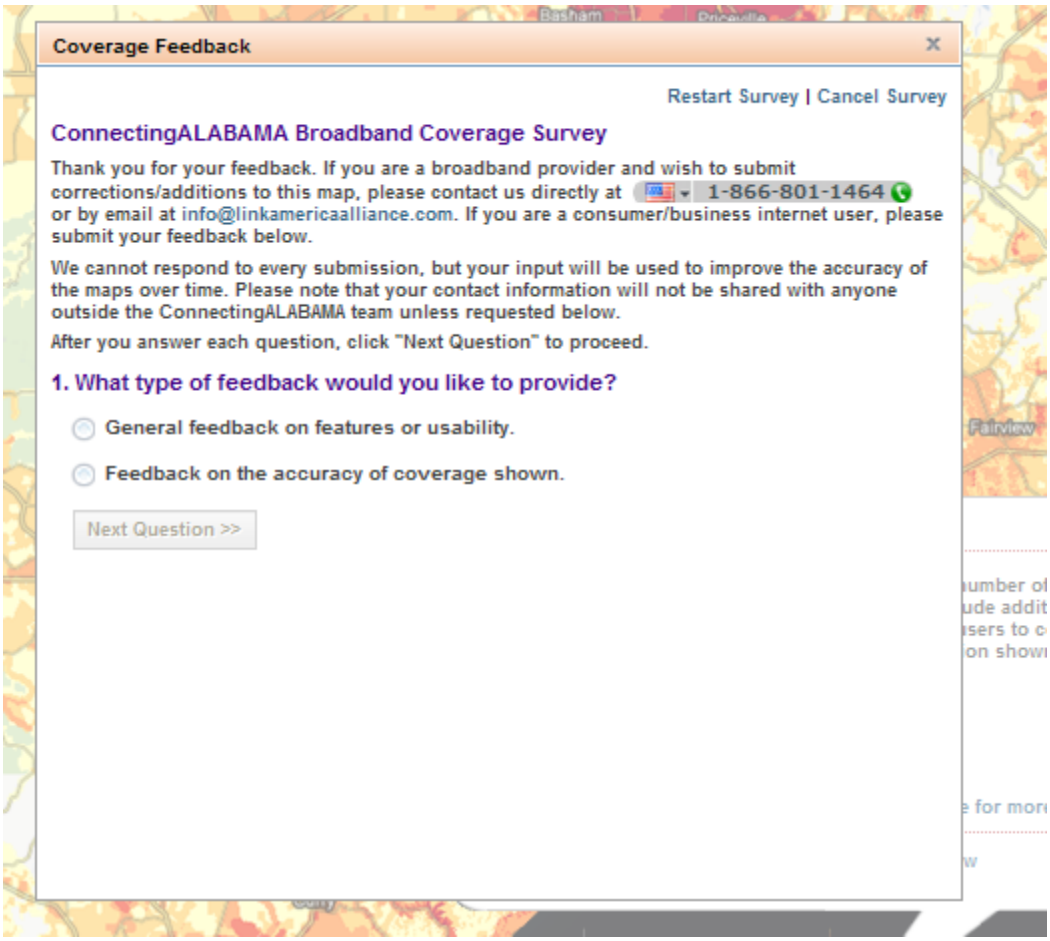


Figure 21--Consumer Feedback Layer

To gather feedback, we use a survey wizard which asks the end users to categorize their concerns. The survey went through several iterations of design and usability testing. Our experience has been unless we get a way to constrain the user feedback into manageable categories, it becomes very difficult to act upon.



As mentioned by other Grantees we struggle with how to use all of the feedback we receive. The qualified data points seem to fall below a volume in which we can infer significant modifications to the map data. Nevertheless, we believe it is important to gather structure and display the feedback to support project transparency.

Perception of Unfair Treatment Across Technologies

Several Broadband service providers have expressed strong concerns regarding how wireline services are displayed, as contrasted to how wireless coverage is displayed. This is an artifact of the SBI data model. As an example, consider the figure below.

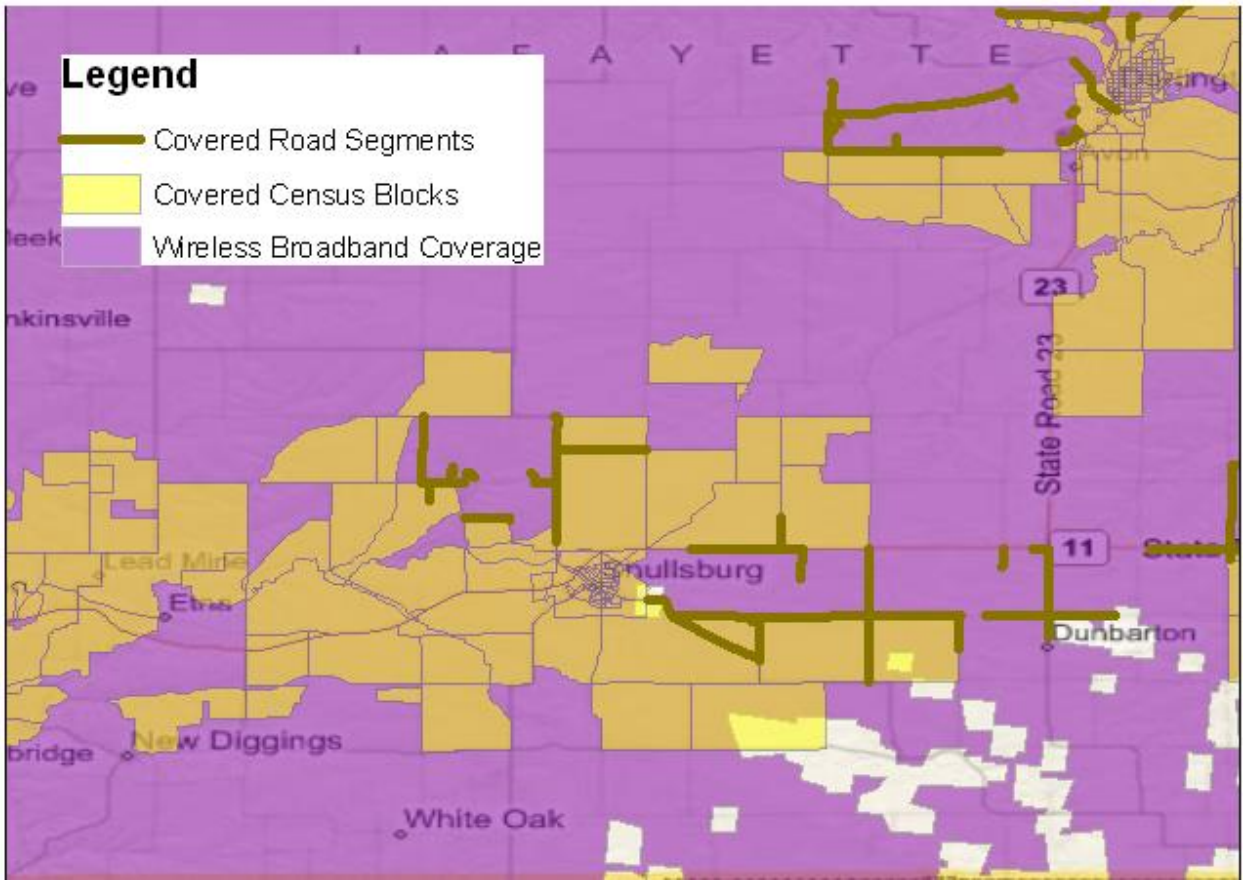


Figure 22--Multi Network Coverage portrayal

In this image, covered Census Blocks are light gold. Covered road segments are a darker gold and wireless coverage is purple. The concern seems to come down to how a wireline provider's coverage is shown in the large Census Blocks (greater than 2.0 sq mi). Some wireline providers have expressed dissatisfaction because their coverage is only tied to road geography, which leads to a visual "hole" in their coverage map. At the same time, they feel that it is unfair that the wireless provider's coverage is shown to be uniform in the same area. Put another way, if our maps show wireline in terms of Blocks and segments, why don't our maps show wireless the same way? This concern is getting amplified because wireless speed does not vary by block whereas wireline does.

Loss of Geographic Granularity

Some providers particularly those who submitted facility level information are disappointed when we have to roll the derived data up to Census blocks or road segments as this changes the appearance of their service areas. This is especially important in rural areas where the larger blocks represent more of the service territory. Further, the FCC Order requesting service level boundaries has made some providers unhappy when submitted block level information does not line up with their service areas.

Perceptions of Carrier of Last Resort (COLR) Obligations

Some wireline providers have also expressed dissatisfaction because online maps limit the distance of coverage from a road segment. In our current online maps we buffer a wireline carrier's service 300' from road centerline. A number of providers have expressed that they are mandated to provide voice coverage (which Broadband will accompany) anywhere in the Exchange. There seems to be many dimensions to this argument, but the basic concern comes down to not being able to accurately reflect the scope of their COLR obligation within the mixed block/segment view. Their ability (or lack thereof) to actually provision such services for new users within a 7-10 day period adds yet another level of complexity when attempting to fairly portray their coverage capabilities.

Intentions of Coverage Mapping

When a viewer of an online map clicks on the map (or zooms to an address), they are provided with a pop-up of service provider coverage in the area. The critical question is this: what is the area to which that pop-up window responds to? In the past, we reported back to the specific Census block, or buffered road segment intersected by the user click. As far as the map was concerned, once we move off of that road, or out of that segment, we have a new area to examine.

Our sense, given feedback received, is that our provider view should be a bit more tilted toward finding providers in a general area, rather than finding providers at a single-click location. If the goal of the map is to get someone to call a provider for service, our bias should be to include all of the potential providers in the general area, rather than giving potential customers a method to self-disqualify. That is, we want to cast a wider coverage net, rather than one too narrow. The problem with this approach is that it will create a number of false positive Broadband reports. As of this date we cannot determine if the claims of inaccurate coverage in online maps are due to the looser provider view standard or not. We keep this looser standard in place to minimize the likelihood of self-disqualifications.

Appendix One--Wisconsin

Community Anchor Institutions

In earlier submissions, the Community Anchor Institution (CAI) process was referred to in terms of a learning curve. This continues to be an appropriate metaphor. The mapping team continues to focus on data that will support and help inform policy makers and the SBI planning process. Obtaining connectivity information for CAIs continues to be a significant challenge. In general we have found that one of the primary obstacles is identifying the correct person in the CAI organization that can provide the information we seek.

In the first submission, the team gathered information on what data was available and what resources will be required to engage these categories of important institutions. In subsequent submissions we have focused our efforts on obtaining connectivity information for CAIs through direct outreach to the specific institutions as well as through central sources within the state or institution associations. In the current submission we had the following objectives:

1. Obtain missing connectivity data for schools, focusing on district level contacts.
2. Identify the correct person in the organizations that can provide connectivity data for the institution.
3. Raise awareness of the broadband mapping program to organizations associated with the CAI categories with special emphasis to relevant local and, state government agencies.
4. Continued outreach to unresponsive CAIs to invite them to become engaged with the SBI program by participating in the online survey.
5. Update connectivity information based upon new survey information
6. Continue to update the physical addresses of the CAIs, with the goal of eliminating P.O. Boxes from the dataset

CAI Philosophy

Our work with CAIs is guided by three principles.

First, CAIs are important stakeholders within the planning process. Our goal is to engage participants in regional planning that have strong ties into the CAI categories identified by NTIA. This has a direct benefit of engaging an established stakeholder community. It also allows broadband planning to tie into existing organizational and planning networks. In each of our states, key relationships with education, public safety, libraries, and economic development sectors are being identified and developed.

Second, we believe that CAIs will likely be one of the primary beneficiaries of targeted broadband funding. Our belief stems from the sense that many of the benefits of Broadband will extend from these community 'anchor points'. In other words, it isn't solely the existence of Broadband at a library that provides a benefit. It is people using applications that work only on a Broadband network to upgrade their skills (e.g., online training) and gain access to online content (e.g., job postings, goods and services), etc. The targeted use of a specific application--that can only take place with Broadband networks-- is what produces the priority benefit. Put another way, there seems to be a realization that

things are less about pure connectivity (for the sake of connectivity) than about connectivity in terms of an application (for the sake of the benefit obtained through the application).

Third, we continue to use a rational and targeted approach to derive information. This means we will utilize our planning teams for as much field work as possible. This also means that a goal of our CAI process is not an exhaustive Census of anything that could be a CAI; rather, it is the discovery, inventory and integration of Broadband planning activities into those CAIs that stand to produce the greatest synergies with the SBI planning process.

The above implies two significant points. First, the team's goal is to document community anchor institution connectivity within a broader context of regional and statewide planning objectives. Second, if a particular category of CAI has an independent Broadband planning effort underway, we will encourage that organization to take the lead, and we will provide relevant expertise and support as warranted. For example, in one of our states, the public safety community was engaged in a mobile Broadband survey effort. We aligned our CAI data collection process with that effort and shared information and expertise (e.g., hosting a survey) to support their mission. In another state we attempted to glean connectivity information from a municipal government survey. There may be some downside to this collaborative approach in that we may have to work with data spanning different times or we may not have all of the location-specific information we need, but this does prevent the same user from receiving multiple inquiries.

Anchor Institution Survey

During the third submission period we designed and developed a simple on-line survey system called CAVS (Community Anchor Verification Survey). The intent of the survey was to both verify received connectivity information and garner additional connectivity information from CAIs. The link for the survey is housed on the Home Page of the State SBI website, thus providing the added opportunity for responding institutions to learn more about broadband activities in their state. The survey remains open between collection periods so that the Regional Planning Teams can update information as they engage with the community, and to allow responding institutions access to update their data as necessary.

Although we have found that reaching out to central contacts, for specific institution groups, is the most fruitful way of collecting connectivity data we find value in inviting individual anchor institutions to participate through means of a survey. In each round we reach out to CAIs using an adaptive approach that consists of: 1) Emailing individual institutions inviting them to participate in the on-line survey; and, 2) Follow-up phone calls, when appropriate, to the CAIs to obtain/confirm contact information and encourage participation in the survey. From our perspective, although this method is very time consuming and work intensive, it allows the opportunity to personally explain the objectives of the program and answer questions. It also provides an opportunity for the individual institutions to become engaged in the broadband planning process.

Anchor Institution Trends

To date we have focused our CAI attention on schools, libraries, and hospitals with respect to connectivity. We benefit from strong relationships throughout the education sector, (K-12 and Post-Secondary), and have found excellent resources with State librarians. In addition, we have formed organizational relationships with the major hospital associations and other key health organizations within each state. Our goal with these relationships is to cull information from their planning process and partner with them on outreach.

As in the prior submissions, we rely on public domain sources of information for the public safety-category. Collecting connectivity data for this group continues to be one of our most significant challenges. We continue to look for ways to reduce the size of this category and connectivity information specific to root nodes of the public safety network--such as County Emergency Operation Centers.[28] Through our interaction with this sector we have learned that there are real security concerns about having information about their network connections being made available on a public site. In many instances this prevents them from fully participating in the survey.

Further, because we have a wide ranging population of CAIs in our data set we have a variety of Broadband services that don't always fit NOFA parameters. Services like PRI or T1 are classified into "other copper," We also had difficulty obtaining both the upstream and downstream channel capacities. In most instances, when it was logical to do so, we made the speeds symmetrical, but this is an assumption on our part. If a site records bandwidth across several services (eg. video and data), we record the total bandwidth to give a picture of available site bandwidth. We are also working to standardize our response to NTIA in circumstances where an entity shares a Broadband connection among a campus. In this case we use the total campus bandwidth and use the primary campus Internet connection. In this regard, we have also received strong comments that for many school districts the problem is less about connectivity to a central node then connectivity from the central node out to served buildings.

As a final verification step, we attempt to screen the CAI data for duplicate values. Because many CAI are closely clustered together and may even share the same building (physical address) we perform the de-duplication manually.

[28] Within the public safety category, it is also very difficult to derive precise locations as many CAI are addressed to PO boxes . This is further complicated due to the many Volunteer Fire Departments used in Rural Communities which often do not have a physical location.

Appendix Two

Data Collection Challenges

This section summarizes some of the challenges we have experienced with data collection and processing. The team believes it is important to categorize these challenges as they help inform the geoprocessing and verification methods used. It is also our hope that some of the more global issues can be discussed and decided within the Grantee community.

We begin with several global issues and then continue toward more granular challenges.

Global Data Collection Issues

Maximum Advertised Speed is Not Reported Consistently

As has been discussed in webinars and also within the context of NTIA data assessments, much reported speed information continues to be reported at the market level (MSA/RSA) and then uniformly pushed down to the Census blocks. This has a tendency to create a problem with NTIA speed tripwires since the technology is reported by block but the maximum advertised speed is reported at a regional level.

This challenge gets further amplified at a block level when comparing to a third party data provider. It can create a mismatch between third party data generated at an area larger than block level versus block level generated speed and vice versa. To minimize the potential confusion, it might be helpful to be able to provide a flag at the submitted record level which indicates the geographic basis by which the Maximum Advertised Speed is reported.

Census Block and Road Standards are not clear

There seem to be several methods by which providers are calculating the Census block area. So the distinction at 2.00 square miles can be uniform, it would be ideal to articulate an operational area calculation definition.

Providers Not Wishing for Block Level Aggregation of Their Data

For providers who submit address point data, we do minimal additional processing. Our main test is to ensure that points are contained within 1 mile of exchange boundaries; the only other processing was normalization into NTIA formats.

Broadband providers not Meeting the NOFA "provider" Definition

Comments on PBWorks appear to reflect a concern among a number of grantees about what a Broadband provider is--and how that definition impacts mapping.

If the 7-10 day provisioning rule is to be strictly enforced, it could seem to eliminate a number of prominent Broadband providers[29]. Further, the need for clarification around a facilities-based provider,

[29] By email ***REDACT*** informed us they could not provision in 7-10 days, but they also supply information on qualified locations to the address point level. Therefore, we draw a distinction between an incumbent provider owning the facility--which terminates at a customer premise--who cannot turn up service at a qualified location, versus a provider not reporting any specific qualified locations in which they cannot turnup service in the 7-10 day

versus the reseller, has injected even more uncertainty. Right now we are unclear on how strictly to interpret either of these important distinctions, but we are concerned that we are beginning to create an NTIA exclusion criterion that is going to confuse downstream consumers of the data.

Given mergers and acquisitions in the CLEC space we are noticing a drop off in participation in this program by several national CLECs. We hope this is an artifact of the mergers and resource constraints rather than a long term trend.

Again, we do not want to exclude a service provider, but we believe there needs to be further clarification around the "7-10 day rule," the definition of a "reseller," and better interpretation of facility-based providers, versus equipping UNEs, SpA or leased lines.

We have used the provider Type of "Other" to classify a number of providers who offer Broadband services, but we do not offer them in a manner consistent with Technical Appendix A definitions.

To What Extent Should We Begin "Classifying" the Data and Maps?

The question immediately preceding gets to the intent of a Broadband provider. This question gets to the intent of the Data and Maps.

Earlier in this document we discussed the question of what type of bias we should introduce to our online map messaging. In an online environment, do we want to more likely create an overstatement of coverage for a provider than an understatement? In other words, is the larger problem allowing a consumer to self-disqualify, versus calling a number of neighboring providers? There is a related issue to this. Clearly in our maps there is a lot of scatter in data that we believe should be more continuous. These are the islands of coverage from an incumbent provider[30]. There are a number of processes that could be put in place to deal with this type of scatter, but without more information from the service provider-- essentially the last mile facilities-- it will be difficult to perform this clean up in an informed manner. On the one hand, we can aesthetically clean the maps up and reduce the scatter, but we have little sub-block engineering information upon which to make this decision. Right now our preference is to put out a somewhat aesthetically messier deliverable and work with providers to get better information to clarify their submission. If that isn't forthcoming, we are limited in what can be done given the lack of facility level information. In summary this yields two questions

In our online maps should we error on overstating coverage to prevent consumer self-disqualification?
In our online maps should we work to clean up a lot of the scatter that we see without having facility-based evidence from which to remove it?

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window. In the first case we have a sense of where service can be offered and verified. In the second, we have no evidence that a service could exist there until a specific location becomes a customer.

[30] For a provider who sells opportunistically (not within a franchise area) it becomes even more problematic to classify their coverage because the points are more related to the type of consumer purchasing the service than a bounded offering. In a matter of speaking, the ProviderType is more determined by the technology and/or location than a type of business. The core intent of the NOFA and our grant application was centered around the 7-10 day providers but we believe maintaining information on provider Type "Other" and "Reseller" is important to assist in validation and market segment analysis as resources are available.

As we examine results from third party data assessments, it appears that this scatter is something that is also problematic with the assessment results. It also appears to be evident that different third party data sources treat water areas differently. When we are developing data based upon Wireline facilities, we exclude water blocks. We do not filter out water blocks from provider submitted data. We are unsure if there is or should be a standard in how water covered blocks are treated for Wireline broadband providers.

Community Anchor Institution Surveys

Over time the base of participation in CAI surveys has broadened. Our teams are interacting with more organizations interested in broadband planning. This is a benefit because it helps integrate the importance of Broadband mapping, planning and capacity building within their organizational framework. But it also begins to create challenges in data collection. There are two noticeable trends in this area.

First, CAIs are organizationally diverse. For a school, you expect to have a centralized entity that can answer and support questions about Broadband services. For a rural, volunteer fire department answering questions about broadband may go to the Chief. The way that he/she answers about Broadband is probably specific to her experience and context. The implication is two-fold. First saying that some percentage of CAIs in a state have access to broadband can be misleading because the formality of a school or government building is much different than the formality of a volunteer fire department. Second, that volunteer fire department may get broadband via a 3G mobile hotpsot when they need it…but the presence of *this* type of broadband is a very different thing than the presence of a responder who has mobile LTE broadband.

Second, technical knowledge of the survey respondent differs within each organization. This complicates our data collection. It is not uncommon for someone to say yes we have Broadband, I just don't know how we get it or how fast this is. So in response we report they are broadband served but unknown speed or technology. This doesn't mean they haven't been surveyed, it just means the response was unknown. As there are now a large number of people collecting this data, it would be helpful to have some consistent national business rules from which we can answer questions about the meaning of any particular data element. As an example, when should "no" be used versus when should "unknown "be used. In other words, what is the standard for the difference between never made contact with the CAI versus a respondent didn't know/couldn't answer. We have guidelines internally but are unsure if this is consistent across states.

Granular Data Collection Issues

Non-Uniform Submission Standards

It is clear among providers that there isn't a consistent method used to derive Broadband coverage. Some providers appear to be use a geocoding approach and then point in polygon or point on segment process. Others may be using GPS locations. In some cases, it is difficult to infer what reference data was used to georeference plant (is it the carrier's roadbase?). This leads to uncertainty regarding the input data scale or accuracy relative to other base layers. Although we may be trading off absolute

accuracy, our standard has been to conflate submitted data to TIGER 2010 Blocks and TIGER 2010 roads. We perform our verification against this conflated data product.

Temporal

We are unsure of how well the data are temporally consistent. Some providers gave us their best effort to control to the requested survey date. We note that some providers were clear that the submission was as of extract date without any way to move back in time. They have no means to control for time and cannot provide any audit support beyond when the data are released to us. Some data-especially loop qualification data-may change from day to day. It will be very difficult to clarify why something was changed from a given point in time.

Perceived Inaccuracy with Respect to Internal Standards

The NOFA is clear on submitting a list of Blocks in which a provider delivers Broadband service. This is a different objective than perfectly reflecting service territories. If a firm's accuracy standard is a reflection of their service area, then the data created under the NOFA will not meet their perception of accuracy. This leads to two other issues: First, using Census Blocks rather than serving area may overstate or understate a particular provider's Broadband serving area. This was a significant concern of ***REDACT*** who specifically required us to submit only address-level qualification data. The second issue this brings up is how or if, there should be some standard on how much of a Census Block needs to be covered to call it covered.

Confidentiality

Several providers have noted concerns with CPNI-related issues and have stated this as a reason for non-participation. We have also heard expressions of comparable concern regarding identifiable responses to Anchor Institution information.

Unclear on Definitions

As discussed earlier, several providers claimed confusion on several key terms involved in Middle Mile. We note a consistent stream of questions around the interpretation of Maximum Advertised Speed. Some providers understand this to be the most common speed package bought within the mass market, while others view this as a speed that can be purchased for an additional cost above a mass market offering (e.g. a Turbo option for an additional fee per month). Others interpret this as the fastest speed that is available for that particular location--in terms of xDSL, a structure qualified speed, for example.

Perception of Data Use

There seems to be some hesitancy releasing speed information because no one is sure of how the information will be used, or what the speed is intended to reflect. A number of providers have verbally indicated that typical speed will be about (on average) 80% of purchased speed due to overhead. But there are many other factors (such as a user's home network) that influence speeds measures. Providers are concerned about introducing statistics without a clear understanding of how those statistics are derived and will then be used. Also, as advertised speed is pushed down to a block level, we sense more trepidation to report speed values. This quickly begins to touch on parity across network types (why is wireline down at the block when wireless is half the state, etc.). Finally we note a

significant increase in speed values reported to us. This may be due to network upgrades or competitive concerns to match the theoretical network speed.

Location Uncertainty In Source Data

Within this document we have noted concerns about the impact of source data accuracy. Our geoprocessing methodology provided what we believe is a relatively conservative tolerance to account for the scale issue in the source data, but we are unsure of how this may impact downstream users. Clearly, it also impacts the verification process because we can't attempt to verify received data beyond a scale at which it was developed.

Covered Segment Process

Deriving Broadband covered segments in Census Blocks greater than 2 square miles has proved to be a challenge. Moving from a NOFA specified tabular deliverable to a requested geographic deliverable also increases the complexity of the effort.

Record Level Metadata

It would be helpful to have one or two additional fields in each feature class transmitted to NTIA. One User Defined field could be helpful as an expression of record level confidence. The second field could be used as a Key between the transfer geodatabase and our systems. Ideally, both fields could be large text fields (50 char) so the Grantee can use them to express a variety of attributes.

Miscellaneous Data Collection Notes

We note the following important observations regarding our data submission:

There are Middle Mile plant records for providers who are not present in the Census block, segment or wireless area feature classes. This is due to classification as non-NOFA Broadband providers.
In some cases, we have trimmed wireless coverage estimates to honor state boundaries.
We believe some providers are trimming their coverage to honor license area boundaries.
Where a provider submitted Middle Mile points out of state, we are no longer passing those points to NTIA as they fail the validation script.
In tables with mandatory Street and Zip5 attributes (Service Address), if the value is unavailable we fill the default value.
As before there remain some differences between the Data Model, Data Model Default Values and the Python Validation Script.
We have a significant amount of VDSL, ADSL 2 and ADSL 2+ coverage categorized into the xADSL category. This introduces large variance in speed availability as some providers are using VDSL, shortened loops and/or pair bonding to increase speed to levels nearly 30 Mbps.
We note a few providers who have speeds seemingly inconsistent with their technology of transmission. This is either very low speeds with optical fiber, or very high speeds with non DOCSIS 3.0 systems. We have verified on provider websites that the reported speeds are available in the area but these speeds will fall out of the NTIA frequency table analysis.
We have a small number of providers who serve an area with both a residential and business speed tier. In cases where we cannot distinguish which speed tier offering to use, we use the higher of the speed tiers.

Per NTIA request we have modified the manner in which we handle Wireless coverage polygons. If a Provider submits a single geometry but specifies multiple spectrum codes in use in that polygon, we duplicate the polygon for each spectrum code. In other words the geographic object is identical but the attribute data for the object is unique.

In point level data submissions (Service Address and CAI) we note points that are spatially coincident. With respect to Service Address points our thought is these represent multi-unit dwellings or businesses but we don't have enough address detail to determine if these are multi-unit structures or duplicated customers. Because we cannot determine the reason for the duplication we leave spatially coincident records in our submission. We also leave in our CAI submission points which may be the same physical structure but have slight variations in addressing.

In point level middle mile data, we are finding a variance in the quality of the geocoded longitude and latitude returned. Given the data received we are unsure if this is an issue where the plant address is difficult to geocode or if the longitude and latitude provided to us is different than what would be returned in geocoding.

For Block and Segment level data which we produce based upon provider facility or service area boundaries, we remove Census blocks which are entirely water covered. This results in a drop of Census block counts for a number of providers.

Appendix Three

This appendix contains the confidentiality clarification supplied in a series of emails between CostQuest and NTIA.

Feature Class	*Metadata*	*NOFA Confidential?*	*Online Map*	*Public Disclosure*	*Exemption*
Last Mile	Constraints on accessing and using the data	Yes	No	No	None
	Access constraints: None				
	Use constraints:				
	This data is confidential as defined in the NOFA.				
Middle Mile	Constraints on accessing and using the data	Yes	No	No	None
	Access constraints: None				
	Use constraints:				
	This data is confidential as defined in the NOFA.				
Service Address	Constraints on accessing and using the data	No	No	Yes	
	Access constraints: None				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
CAI	Constraints on accessing and using the data	No	Yes	Yes	NO attributes on any record in this feature class are considered confidential

	Access constraints: None				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
Census Block	Constraints on accessing and using the data	No	Yes	Yes	NO attributes on any record in this feature class are considered confidential
	Access constraints: None				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
Service Overview	Constraints on accessing and using the data	No	Yes	Yes	The only provider who may not show up on this table is a provider who has provided only confidential data (last mile, Middle Mile,

					address point with provider name)
	Access constraints: None				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
Road Segment	Constraints on accessing and using the data	No	Yes	Yes	NO attributes on any record in this feature class are considered confidential
	Access constraints: None.				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
Wireless	Constraints on accessing and using the data	No	Yes	Yes	NO attributes on any record in this feature class are considered confidential
	Access constraints: None				
	Use constraints:				

	There are no restrictions on distribution of the data by users

Appendix Four-Wisconsin

This appendix details our analysis of the potential and actual broadband provider market. We include both our internal tracking description document and then our categorization for each provider. As this extract was made prior to final submission, there may be differences between provider categorization and the attributes on the day of submission to NTIA.

Provider Categorization

Provider Type and Status Definitions

The Provider Type is based upon categories provided by NTIA, while the Provider Status is based upon categories developed internally for tracking purposes. It should be noted that the Provider Status discussed here relates to the provider's overall status within the program.

Provider Type Codes and Definitions:

NTIA code	Code	Name	Definition
1	P	Provider	This code applies to all confirmed providers of broadband service per the SBI program NOFA. A provider is given a "P" designation if we have determined that the company does indeed exist and appears to be providing broadband services.
2	R	Reseller	This code applies to all broadband entities that have been confirmed as pure resellers – meaning they do not own their own facility/equipment and simply resell services under their own brand name or the brand name of an actual Provider.
3	O	Other	The code applies to entities who were originally placed on the SBI provider list, but whose status is still in question or has been determined to be non-NOFA compliant.
	N/A	Not applicable	This code applies to entities who appeared on the original state provider list or a third party list (such as the FCC 477, American

4			Roamer, or Warren Media lists) but who have been confirmed as NOT providing broadband services.
	X	Inactive	This code applies to entities that may have appeared on an early provider list but whose identity and existence we subsequently have been unable to verify. This code may also apply to providers who have since been acquired or simple gone out of business and for which no FRN appears on the FCC list – These no longer need to be reported to NTIA. This is an INTERNAL category used to remove entities completely from the list of entities submitted to NTIA.

Once the proper Provider Type has been assigned to an entity, an overall Provider Status must be established. The Provider Status codes are specific to the Provider Types, and are not interchangeable. The following table lists the status codes associated with each Provider Type.

Provider Status Definitions

Provider Type Code	Provider Status Code	Name	Definition
P	D	Declined	A provider is given a Status of "D" if they have officially stated verbally or in writing that they will not participate in the SBI program.
	P	Participating	A provider is considered to be "Participating" if they have submitted USABLE data in at least one data submission round. The data does not need to be 100% complete for a provider to be assigned a "P" code – they simply have to have provided a level of data that is sufficient to submit to NTIA.
	NR	Non Responsive	A provider is considered "Non Responsive" if they have either failed to respond to any of our correspondence, or they have submitted insufficient data that makes inclusion of their data in the NTIA submission impossible.
	V	Submitted under other ID	A provider whose data is submitted under another Provider ID, but is operating under their own FRN.
	E	Estimated	A provider is marked as "Estimated" if they have not submitted usable data, and would otherwise be considered non-responsive, BUT for whom we are able to submit data by using estimation techniques and/or third party sources. This designation applies only to providers whose data is 100% estimated.
R	R	Reseller	"R" is the only status code for Resellers and it simply reconfirms their status as a reseller –data may not be submitted but name of provider is included in NTIA data package.
O	U	Unknown	The status of Unknown is assigned to an entity whose name has appeared on a list (or been submitted as a new possible provider) and is currently under investigation. It has not been determined yet if this entity is indeed offering broadband services or not.
	NC	Non-Compliant	This status is assigned to entities who appear to be in the broadband industry, but who do not meet the formal definition of a BB provider under NOFA requirements. Examples may be entities who cannot provision service within 7-10 days.

	P	Participating	These are providers who do not meet the formal definition of a BB provider under NOFA requirements, but are participating in the program and submitting data.
	NP	Not a Provider	This status applies to entities who may appear on a third partly list of valid providers, but who have been proven to either no longer exist, or simply no longer provides broadband services.
N/A			No status codes associated with this Provider Type
X			

Provider Disposition

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
192	WI	24-7 Telcom, Inc.	24-7 Telcom, Inc.	West Wisconsin Telcom Cooperative, Inc.	P	P
193	WI	360 NETWORKS (USA) INC	360 NETWORKS (USA) INC		O	NC
194	WI	ACCESS MEDIA 3, INC.	ACCESS MEDIA 3, INC.		X	
195	WI	ACCESS ONE INC	ACCESS ONE INC		X	
198	WI	AIRDIS LLC	AIRDIS LLC		X	
199	WI	Airespring, Inc.	AirespriNg, Inc.		R	R

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
202	WI	Amery Telecom	Northwest Communications	Amery Telcom, Inc.	P	P
203	WI	Amherst Telephone Company	Amherst Telephone Company	Amherst Telephone Company	P	P
206	WI	AT&T Inc.	AT&T Services, Inc.		P	V
207	WI	AT&T Corp, Inc.	AT&T Corp, Inc.		P	P
209	WI	Badger Telecom, LLC	TDS	Telephone and Data Systems, Inc.	P	P
212	WI	Baldwin Telecom, Inc.	Baldwin Telecom, Inc.	Baldwin Telecom, Inc.	P	P
215	WI	Bayland Communications, Inc.	Nsight Telservices	Northeast Communications of Wisconsin, Inc.	P	P
217	WI	Lynch Interactive Corporation	Belmont Telephone Company		P	V
218	WI	Bergen Telephone Company	Bergen Telephone Company	Bergen Telephone Company	P	P
220	WI	Black Earth Telephone Company, LLC	TDS	Telephone and Data Systems, Inc.	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
221	WI	Bloomer Telephone Company	Bloomer Telephone Company	Bloomer Telephone Company	P	P
222	WI	Bonduel Telephone Company, LLC	TDS	Telephone and Data Systems, Inc.	P	P
225	WI	Broadwing Communications, LLC	Broadwing Communications, LLC		P	V
227	WI	Brown Telephone	Nsight Telservices		P	V
228	WI	Bruce Telephone Company, Inc.	BruceTel Communications LLC	Bruce Telephone Company, Inc.	P	P
230	WI	Burlington, Brighton & Wheatland Telephone Company, LLC	TDS	Telephone and Data Systems, Inc.	P	P
231	WI	Spring Valley Telephone Company, Inc.	Celect Communications, LLC	Celect Communications	P	V
232	WI	Central State Telephone Company, LLC	TDS	Telephone and Data Systems, Inc.	P	P
234	WI	CenturyTel, Inc.	CenturyTel Acquisition LLC		P	V
239	WI	Cheqtel	Norvado	Cheqtel Communications	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
240	WI	Chequamegon Communications Cooperative	Norvado	Chequamegon Communications Cooperative, Inc.	P	P
242	WI	Choicetel LLC	Choicetel LLC	Choicetel LLC	P	P
244	WI	CITIZENS FIBERNET INC	CITIZENS FIBERNET INC		N/A	NP
245	WI	Citizens Communications Company	Frontier Communications Corporation	Frontier Communications Corporation	P	V
246	WI	Citizens Telephone Cooperative, Inc.	Citizens Telephone Cooperative, Inc.	Citizens Telephone Cooperative, Inc. (WI)	P	P
248	WI	Clear Lake Telephone Company LLC	Clear Lake Telephone Company LLC	Clear Lake Telephone Company	P	P
252	WI	Cochrane Cooperative Telephone Company	Cochrane Cooperative Telephone Company	Cochrane Cooperative Telephone Company	P	P
254	WI	Comcast of Minnesota Wis. Inc.	Comcast		P	V
258	WI	Coon Valley Farmers Telephone Company	Coon Valley Farmers Telephone Company	Coon Valley Farmers Telephone Company, Inc.	P	P
263	WI	CTC Telecom	Mosaic Telecom	CTC Telecom	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
264	WI	Cuba City Telephone Exchange	Cuba City TelephoNe Exchange Co		P	V
265	WI	Mid West Data Systems	CyberZone		P	NR
267	WI	Dickeyville Telephone, LLC	TDS	Telephone and Data Systems, Inc.	P	P
268	WI	DIECA Communications, Inc.	Covad Communications Company	Covad Communications Group, Inc.	N/A	NP
270	WI	DiscoverNet	Wireless Wisconsin		P	NR
271	WI	DSLnet Communications, LLC	DSLnet Communications, LLC	N/A	N/A	NP
272	WI	Eastcoast Telecom Of Wisconsin, LLC	TDS	Telephone and Data Systems, Inc.	P	P
273	WI	Hickory Tech Corporation	Eventis Telecom Inc.	Hickory Tech Corporation	N/A	NP
276	WI	Farmers Independent Telephone Company	Grantsburg Telcom	Farmers Independent Telephone Company	P	P
279	WI	Frontier Communications - St Croix, Inc.	Frontier Communications - St Croix, Inc.	Frontier Communications Corporation	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
280	WI	Frontier Communications - Viroqua	Frontier Communications - Viroqua	Frontier Communications Corporation	P	P
281	WI	Frontier Communications of Wisconsin	Frontier Communications of Wisconsin	Frontier Communications Corporation	P	P
285	WI	Global Crossing North America, Inc.	GLOBAL CROSSING TELECOMMUNICATIONS, INC.	Global Crossing North America, Inc.	R	R
287	WI	GRANITE TELECOMMUNICATIONS LLC	Granite Broadband, Inc		P	NR
288	WI	Grantland Telecom, LLC	TDS	Telephone and Data Systems, Inc.	P	P
289	WI	Hager Telecom, Inc.	Hager Telecom, Inc.	Hector Communications Corporation	P	P
291	WI	Hillsboro Telephone Company, Inc.	Hillsboro Telephone Company, Inc.	Hillsboro Telephone Company, Inc.	P	P
295	WI	ILLINOIS TELEPHONE CORPORATION	ILLINOIS TELEPHONE CORPORATION		N/A	NP
296	WI	Indianhead Telephone Company	Indianhead Telephone Company	Hector Communications Corporation	P	P
302	WI	KAUKAUNA UTILITIES	KAUKAUNA UTILITIES		P	NR

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
304	WI	LaValle Telephone Cooperative	LaValle Telephone Cooperative	LaValle Telephone Cooperative, Inc.	P	P
306	WI	Lakefield Telephone Company	Lakefield Telephone Company	Lakefield Telecom, Inc.	P	P
308	WI	Lakeland Telecom, Inc.	Lakeland Telecom, Inc.	Lakeland Communications, Inc.	P	P
309	WI	LAMBEAU TELECOM COMPANY, LLC	LAMBEAU TELECOM COMPANY, LLC		R	R
310	WI	Talk America	LDMI TELECOMMUNICATIONS INC		N/A	NP
312	WI	Level 3 Communications, LLC	Level 3 Communications, LLC	Level 3 Communications, LLC	P	P
313	WI	Luck Telephone Company	Luck Telephone Company	Lakeland Communications, Inc.	P	P
318	WI	Marquette-Adams Telephone Cooperative, Inc.	Marquette-Adams Telephone Cooperative, Inc.	Marquette-Adams Telephone Cooperative, Inc.	P	P
322	WI	MATRIX TELECOM INC	Trinsic Communications brand.		R	R
323	WI	MCI Communication Services, Inc.	MCI Communication Services, Inc.		O	NC

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
325	WI	PaeTec Corporation	McLeodUSA Telecommunications Services, Inc.	PaeTec Corporation	O	NC
327	WI	Metropolitan Telecommunications Holding Company	Metropolitan Telecommunications Holding Company		R	R
328	WI	Mid-Plains Telephone, LLC	TDS	Telephone and Data Systems, Inc.	P	P
329	WI	Midway Telephone Company, LLC	TDS	Telephone and Data Systems, Inc.	P	P
330	WI	MIDWEST FIBER NETWORKS LLC	TDS Telecom	Telephone and Data Systems, Inc.	O	NC
331	WI	Milltown Mutual Telephone Company	Milltown Mutual Telephone Company	Lakeland Communications, Inc.	P	P
334	WI	Mosinee Telephone Company, LLC	TDS	Telephone and Data Systems, Inc.	P	P
335	WI	Mt Horeb Telephone Company	MHTC	Mount Horeb Telephone Company	P	P
336	WI	Mt. Vernon Telephone Company, LLC	TDS	Telephone and Data Systems, Inc.	P	P
337	WI	NATIONAL COMMUNICATIONS LLC	NATIONAL COMMUNICATIONS LLC		O	U

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
338	WI	NAVIGATOR TELECOMMUNICATIONS LLC	NAVIGATOR TELECOMMUNICATIONS LLC		N/A	NP
339	WI	Nelson Telephone Cooperative	Nelson Telephone Cooperative	Chippewa Valley Cable Co. Inc.	P	P
340	WI	Net Lec, LLC	Nsight Telservices	Northeast Communications of Wisconsin, Inc.	P	V
343	WI	NEW LONDON ELECTRIC & WATER UTILITY	NEW LONDON ELECTRIC & WATER UTILITY		R	R
345	WI	Nextgen Communications, LLC	Nextgen Communications, LLC	Clear Lake Telephone Company	P	P
346	WI	NEXVO LLC	NEXVO LLC		P	NR
347	WI	Niagara Telephone Company	Niagara Telephone Company	Niagara Telephone Company/Wittenberg Telephone Com	P	P
352	WI	Northwest Community Communications	Northwest Communications	Northwest Community Communications	P	P
353	WI	NORTHERN TELEPHONE & DATA CORP	NORTHERN TELEPHONE & DATA CORP		R	R
354	WI	NORTHSTAR TELECOM INC	NORTHSTAR TELECOM INC		R	R

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
357	WI	ONVOY INC	ONVOY INC		R	R
359	WI	TELECOM PARTNERS INC	TELECOM PARTNERS INC		N/A	NP
360	WI	Peerless Network of Wisconsin, LLC	Peerless Network of Wisconsin, LLC		R	R
361	WI	PHOENIX INTERSTATE DATA SYSTEMS INC	PHOENIX INTERSTATE DATA SYSTEMS INC		R	R
362	WI	PIONEER COMMUNICATIONS INC	PIONEER COMMUNICATIONS INC		N/A	NP
364	WI	PLYMOUTH UTILITIES	PLYMOUTH UTILITIES		N/A	NP
365	WI	POWERCOM CORPORATION	POWERCOM CORPORATION		N/A	NP
366	WI	PRAYZTEL COMMUNICATIONS LLC	PRAYZTEL COMMUNICATIONS LLC		N/A	NP
367	WI	Price County Telephone Company	Price County Telephone Company	Price County Telephone Company	P	P
368	WI	Qwest Communications Company, LLC	CenturyLink	Qwest Communications International, Inc.	N/A	NP

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
369	WI	Reedsburg Utility Commission	Reedsburg Utility Commission	Reedsburg Utility Commission	P	P
373	WI	Rhinelander Telephone Company	Frontier Rhinelander Telephone Company	Frontier Communications Corporation	P	P
375	WI	Richland-Grant Telephone Cooperative Inc.	Richland-Grant Telephone Cooperative Inc.	Richland-Grant Telephone Cooperative, Inc.	P	P
377	WI	Riverside Telecom, LLC	TDS	Telephone and Data Systems, Inc.	P	P
378	WI	Sage Spectrum, LLC	SAGE TELECOM INC		N/A	NP
381	WI	Scandinavia Telephone Company, LLC	TDS	Telephone and Data Systems, Inc.	P	P
382	WI	Sharon Telephone Co.	Sharon Telephone Co.	Sharon Telephone Company (IL & WI)	P	P
385	WI	Siren Telephone Company, Inc.	Siren Telephone Company, Inc.	Siren Communications	P	P
386	WI	Somerset Telephone Company	Northwest Communications	Amery Telcom, Inc.	P	P
387	WI	Southeast Telephone Co. Of Wisconsin, LLC	TDS	Telephone and Data Systems, Inc.	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
390	WI	Spring Valley Telephone Company, Inc.	Spring Valley Telephone Company, Inc.	Spring Valley Telephone Company, Inc.	P	P
393	WI	The State Long Distance Telephone Company, LLC	TDS	Telephone and Data Systems, Inc.	P	P
394	WI	Stockbridge & Sherwood Telephone Company, LLC	TDS	Telephone and Data Systems, Inc.	P	P
395	WI	STOUGHTON MUNICIPAL UTILITIES	STOUGHTON MUNICIPAL UTILITIES		O	NC
396	WI	Studio Tech LLC	Studio Tech LLC		N/A	NP
398	WI	SUN PRAIRIE WATER & LIGHT COMMISSION	SUN PRAIRIE WATER & LIGHT COMMISSION		O	NC
399	WI	T6 Wireless, Inc.	T6 Broadband	T6 Wireless, Inc.	P	P
400	WI	TCG MILWAUKEE INC	TCG MILWAUKEE INC		R	R
402	WI	Telephone and Data Systems, Inc.	TDS TELECOMMUNICATIONS CORPORATION		P	V
403	WI	TechCom Inc.	Genuine Telecom	Tech-Com, Inc.	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
405	WI	TELEPHONE USA OF WISCONSIN LLC	TELEPHONE USA OF WISCONSIN LLC		R	R
407	WI	Tenney Telephone Company, LLC	TDS	Telephone and Data Systems, Inc.	P	P
408	WI	The Farmers Telephone Company, LLC	TDS	Telephone and Data Systems, Inc.	P	P
410	WI	Tri-County Communications Cooperative	Tri-County Communications Cooperative	Tri-County Communications Cooperative, Inc.	P	P
411	WI	TSR COMMUNICATIONS INC	TSR COMMUNICATIONS INC		O	NC
412	WI	tw telecom of wisconsin l.p.	tw telecom	tw telecom inc.	P	P
413	WI	TWO RIVERS WATER & LIGHT UTILITY	TWO RIVERS WATER & LIGHT UTILITY		R	R
415	WI	Union Telephone Company	Union Telephone Company	Union Telephone Company	P	P
416	WI	P&V Capital Holdings, LLC (US Signal)	US Signal Company, LLC	P&V Capital Holdings, LLC	O	P
418	WI	Utelco, LLC	TDS	Telephone and Data Systems, Inc.	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
419	WI	VCI COMPANY	VCI COMPANY		R	R
420	WI	Frontier North	Frontier	Frontier Communications Corporation	P	P
422	WI	Vernon Telephone Cooperative, Inc.	Vernon Telephone Cooperative, Inc.	Vernon Telephone Cooperative, Inc.	P	P
423	WI	VERTEX BROADBAND CORPORATION	VERTEX BROADBAND CORPORATION		N/A	NP
425	WI	Waunakee Telephone Company, LLC	TDS	Telephone and Data Systems, Inc.	P	P
426	WI	City of Waupaca	WaupacaOnline	N/A	P	P
427	WI	WAUPUN PUBLIC UTILITIES	WAUPUN PUBLIC UTILITIES		R	R
428	WI	WI INDEPENDENT TELE SYSTEMS INC	WI INDEPENDENT TELE SYSTEMS INC		R	R
430	WI	Wittenberg Telephone Company	Wittenberg Telephone Company	Niagara Telephone Company/Wittenberg Telephone Com	P	P
431	WI	Wood County Telephone Company	Solarus	Wood County Telephone Company	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
432	WI	XO Comm Inc.	XO Comm Inc.		R	R
433	WI	YGNITION NETWORKS, INC	YGNITION NETWORKS, INC		X	
434	WI	Airadigm	Airadigm	Airadigm	N/A	NP
436	WI	AllTell Communications	AllTell Communications		P	V
450	WI	Cricket Communications, Inc.	Denali Spectrum License Sub, LLC		P	V
454	WI	Firefly Mobile	Firefly Mobile		N/A	NP
465	WI	LA CROSSE CELLULAR TELEPHONE CO INC	U.S. CELLULAR CORPORATION		P	V
466	WI	LaGrant Connections, LLC	LaGrant Connections, LLC	LICT Corporation	P	P
467	WI	MADISON CELLULAR TELEPHONE COMPANY	U.S. CELLULAR CORPORATION		P	V
472	WI	MILWAUKEE SMSA LTD PARTNERSHIP	MILWAUKEE SMSA LTD PARTNERSHIP		N/A	NP

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
476	WI	AT&T Inc.	New Cingular Wireless Services, Inc.		P	V
481	WI	ONSTAR CORPORATION	ONSTAR CORPORATION		R	R
484	WI	PNG TELECOMMUNICATIONS INC	PNG TELECOMMUNICATIONS INC		P	NR
488	WI	RANGE CORPORATION	Range Telecommunications		R	R
490	WI	ROADPOST USA INC	ROADPOST USA INC		R	R
491	WI	SHARED TECHNOLOGIES CELLULAR INC	SHARED TECHNOLOGIES CELLULAR INC		R	R
494	WI	SOUTHERN & CENTRAL WIRELESS LLC	SOUTHERN & CENTRAL WIRELESS LLC		R	R
497	WI	TELECORP COMMUNICATIONS LLC	TELECORP COMMUNICATIONS LLC		R	R
499	WI	T-Mobile USA, Inc.	T-Mobile	Deutsche Telekom AG	P	P
504	WI	UsCellular	UsCellular	United States Cellular	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
505	WI	USA MOBILITY WIRELESS INC	USA MOBILITY WIRELESS INC		N/A	NP
507	WI	Verizon Wireless	Verizon Wireless	Verizon Communications Inc.	P	P
511	WI	Rural Cellular Corporation	WIRELESS ALLIANCE LLC		N/A	NP
515	WI	WISCONSIN RSA #3 LTD PARTNERSHIP	Nsight Telservices		P	V
519	WI	ZTAR MOBILE	ZTAR MOBILE		N/A	NP
526	WI	Charter Communications	Charter Communications	Charter Communications	P	P
529	WI	Manawa Telephone Company	Manawa Telephone Company	Manawa Telecommunications, Inc.	P	P
531	WI	Mediacom Wisconsin, LLC	Mediacom	Mediacom Communications Corp.	P	P
532	WI	Merrimac Communications Ltd.	Merr.com	Merrimac Communications, Ltd.	P	P
533	WI	MH Telecom LLC	MHTC	Mount Horeb Telephone Company	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
534	WI	Northeast Telephone Company LLC	Nsight Telservices	Northeast Communications of Wisconsin, Inc.	P	P
537	WI	West Wisconsin Telcom Cooperative	West Wisconsin Telcom Cooperative	West Wisconsin Telecom	P	P
539	WI	Wisconsin Bell, Inc	AT&T Wisconsin	AT&T Inc.	P	P
540	WI	AirRunner Networks LLC	AirRunner Networks LLC		P	NR
541	WI	Air-Speed.Net	Air-Speed.Net		P	NR
542	WI	Athenet	Northern Telephone and Data		P	V
545	WI	Chibardun Telephone Cooperative	Mosaic Telecom	Mosaic Telecom	P	P
547	WI	Cutting Edge Systems	Cutting Edge Systems		N/A	NP
550	WI	db Wireless	db Wireless		P	NR
553	WI	Door Peninsula Internet, Inc.	Door Peninsula Internet, Inc.	N/A	N/A	NP

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
554	WI	E-Vergent.com, LLC	E-Vergent Wireless	E-Vergent.com, LLC	P	P
555	WI	Excel.Net, Inc.	Excel.Net, Inc.	N/A	P	P
557	WI	Fibernet Communications Company	Fibernet Communications Company		P	D
561	WI	Lakefield Telecom, Inc.	Lakefield Communications, Inc.		P	D
562	WI	Lemonweir Valley Telephone Company	Lemonweir Valley Telephone Company	Lemonweir Valley Telephone Company	P	P
563	WI	LiteWire Internet Services, Inc.	LiteWire	LiteWire Internet Services, Inc.	P	P
565	WI	Mercury Network Corporation	Mercury Network Corporation	Mercury Network Corporation	P	P
567	WI	Netwurx	Netwurx	Netwurx	P	P
568	WI	NEWWIS	NEWWIS		P	P
569	WI	Northern Telephone and Data	Northern Telephone and Data	Northern Telephone and Data Corp.	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
574	WI	Price County Information Systems LLC	Price County Information Systems LLC	Price County Telephone Company	P	P
575	WI	Selk ElectroNics	Selk ElectroNics		R	R
579	WI	TheGlobalNet	TheGlobalNet		N/A	NP
580	WI	T-NETIX TELECOMMUNICATIONS SERVICES INC	T-NETIX TELECOMMUNICATIONS SERVICES INC		R	R
581	WI	Tri-County Electronics & Internet Service	Tri-County Electronics & Internet Service		P	NR
582	WI	Vernon Communications, LLC	Vernon Communications, LLC	Vernon Telephone Cooperative, Inc.	P	P
583	WI	WaupacaOnline.net	WaupacaOnline.net		X	
584	WI	WI Connect	Computer Connections	N/A	P	P
633	WI	AT&T Mobility LLC	AT&T Mobility LLC	AT&T Mobility	P	P
634	WI	Baldwin Telecom, Inc.	Baldwin Broadband LLC.	Baldwin Telecom, Inc.	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
635	WI	Frontier Communications - Mondovi	Frontier Communications - Mondovi	Frontier Communications Corporation	P	P
649	WI	Megapath, Inc.	Megapath	Megapath, Inc.	N/A	NP
650	WI	Sprint Nextel Corporation	Sprint	Sprint Nextel Corporation	P	P
654	WI	Time Warner Cable LLC	Time Warner Cable	Time Warner Cable Inc.	P	P
655	WI	Western Wisconsin Communications	Western Wisconsin Communications	Tri-County Communications Cooperative, Inc.	P	P
662	WI	CenturyTel, Inc.	CenturyLink	CenturyTel, Inc.	P	P
667	WI	ViaSat, Inc.	ViaSat Communications	WildBlue Communications, Inc.	P	P
669	WI	Chippewa Valley Cable, Inc.	Chippewa Valley Cable, Inc.	Nelson Telephone Cooperative	P	P
672	WI	International Broadband Electric Communications, Inc.	IBEC	IBEC, Inc.	N/A	NP
675	WI	New Edge Network, Inc.	New Edge Holding Company	New Edge Holding Company	O	NC

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
682	WI	Comcast Cable Communications, LLC	Comcast	Comcast Corporation	P	P
683	WI	DiMan Systems	Internet Kmoraine	DiMan Systems	P	P
697	WI	Bayland Telephone, Inc.	Nsight Telservices	Northeast Communications of Wisconsin, Inc.	P	P
715	WI	Packerland Broadband	Packerland Broadband	CCI Systems, Inc.	P	P
719	WI	Rapid Cable	Rapid Cable	N/A	P	E
720	WI	Community Antenna System, Inc.	Community Antenna System, Inc.	Community Antenna System Inc.	P	P
727	WI	Farmers Telephone	Farmers Telephone	Farmers Independent Telephone Company	P	P
728	WI	CellCom	CellCom	Northeast Communications of Wisconsin, Inc.	P	P
731	WI	One Communications Corporation	One Communications Corp.	One Communications Corporation	O	NC
732	WI	Wittenberg Cable TV Company	Wittenberg Cable TV Company	Wittenberg Cable TV	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
742	WI	Bug Tussel Wireless	Bug Tussel Wireless, LLC	Bug Tussel Wireless	P	P
744	WI	Wittenberg Telephone Company	Wittenberg Wireless	Niagara Telephone Company/Wittenberg Telephone Com	P	P
745	WI	Bertram Communications, LLC	Bertram Communications, LLC	N/A	P	P
747	WI	Sonicnet	SonicNet	N/A	P	P
748	WI	Fast-Air Internet, Inc.	Fast-Air Internet, Inc.	N/A	P	P
750	WI	Fastbytes Wireless	Fastbytes Wireless	N/A	P	P
751	WI	Clearwire	Clearwire	Clearwire Corporation	P	P
752	WI	Niagara Community TV Coop.	Niagara Community TV Co-op.	Niagara Community TV Cooperative	P	NR
758	WI	Karban TV Systems, Inc. (KTVS)	Three Lakes Cable TV	Karban TV Systems Inc.	P	P
764	WI	Country Wireless, LLC	Country Wireless	N/A	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
773	WI	Midcontinent Communications	Midcontinent Communications	Midcontinent Communications	P	P
775	WI	JCWIFI.com	JCWIFI.com	Computer Dynamics of NW Illinois, LLC	P	P
780	WI	Wittenberg Wireless, LLC	Cirrinity	Niagara Telephone Company/Wittenberg Telephone Com	P	P
781	WI	Computer Frontier	Cirrinity	Niagara Telephone Company/Wittenberg Telephone Com	P	P
782	WI	Niagara Wireless, LLC	Cirrinity	Niagara Telephone Company/Wittenberg Telephone Com	P	P
783	WI	Wisconsin RSA #7	Element Mobile	Wisconsin RSA #7 Limited Partnership	P	P
810	WI	Broadstar, LLC	Broadstar, LLC	Broadstar, LLC	O	NC
811	WI	Broadview Networks Holdings, Inc.	Broadview Networks Holdings, Inc.	Broadview Networks Holdings, Inc.	P	NR
812	WI	Cogent Communications Group	Cogent Communications Group		O	NC

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
813	WI	DLS Computer Services, Inc.	DLS Computer Services	DLS Computer Services, Inc.	R	R
814	WI	Geneva On-Line, Inc.	Geneva On-Line, Inc.	Geneva On-Line, Inc.	P	P
816	WI	HNS License Sub, LLC	Hughes Network Systems	Hughes Communications, Inc.	P	P
818	WI	NW Spectrum Co.	Next Wave Wireless	NextWave Wireless Inc.	N/A	NP
819	WI	StarBand Communications Inc.	StarBand Communications Inc.	StarBand Communications Inc.	P	P
820	WI	Telephone Associates	Telephone Associates	Telephone Associates, Inc.	P	NR
822	WI	World Discount Telecommunications Company	World Discount Telecommunications Company	World Discount Telecommunications Company	R	R
823	WI	Zayo Group, LLC	Zayo Enterprise Networks, LLC	Zayo Group, LLC	O	NC
835	WI	Wiztech, LLC	Wiztech, LLC		P	P
839	WI	Skycasters, LLC	Skycasters, LLC		P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
846	WI	Tri-Valley Communications, LLC	Tri-Valley Communications, LLC	Tri-Valley Communications, LLC	P	V
847	WI	Nextera Holding, LLC	Nextera Wireless	Nextera Holdings, LLC	P	NR
848	WI	S & K TV SYSTEMS	S & K TV SYSTEMS	S & K TV Systems	P	NR
852	WI	Access Spectrum	Access Spectrum	Access Spectrum	N/A	NP
857	WI	Barat Wireless (USCC)	Barat Wireless (USCC)	Barat Wireless (USCC)	N/A	NP
860	WI	Carroll Wireless, LP (USCC)	Carroll Wireless, LP (USCC)	Carrol Wireless, LP (USCC)	N/A	NP
866	WI	Cincinnati Bell	Cincinnati Bell Any Distance Inc.	Cincinnati Bell Inc.	N/A	NP
874	WI	CYS INC.	RICHLAND CENTER CABLE TV	Richland Center Cable TV	N/A	NP
875	WI	Dairyland Cable Systems Inc.	Dairyland Cable Systems Inc.	DAIRYLAND CABLE SYSTEMS INC.	N/A	NP
884	WI	Great River Energy	Great River Energy	Great River Energy	N/A	NP

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
885	WI	Greenfly Networks, Inc.	Greenfly Networks, Inc.	Greenfly Networks, Inc.	N/A	NP
887	WI	Howard Cable	Howard Cable	Howard Cable	N/A	NP
890	WI	Iowa Wireless Services LP	Iowa Wireless Services LP	Iowa Wireless Services LP	N/A	NP
891	WI	King Street Wireless, LP (USCC)	King Street Wireless, LP (USCC)	King Street Wireless, LP (USCC)	N/A	NP
901	WI	New Century Communications	New Century Communications	New Century Communications	N/A	NP
902	WI	Oconto Falls Cable TV	Oconto Falls Cable TV	Oconto Falls Cable TV	N/A	NP
907	WI	Qualcomm	Qualcomm	Qualcomm	N/A	NP
913	WI	Redwood Wireless Corporation	Redwood Wireless Corporation	Redwood Wireless Corporation	N/A	NP
917	WI	SpectrumCo	SpectrumCo	SpectrumCo	N/A	NP
920	WI	Telefonica International Holding, BV	Telefonica Data Corp SA	Telefonica Data Corp S.A.	N/A	NP

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
922	WI	The IservCo	EagleNet, Inc.	Eaglenet, Inc.	N/A	NP
926	WI	UPPER PENINSULA COMMUNICATIONS	UPPER PENINSULA COMMUNICATIONS	Upper Peninsula Communications	N/A	NP
927	WI	US Cable	US Cable	N/A	N/A	NP
928	WI	VILLAGE OF BOAZ	VILLAGE OF BOAZ	Village of Boaz	N/A	NP
932	WI	WINDSTREAM COMMUNICATIONS INC	WINDSTREAM COMMUNICATIONS INC	Windstream Corporation	N/A	NP
933	WI	Xanadoo Company	Xanadoo	Xanadoo Company	N/A	NP
937	WI	Telovations, Inc.	Telovations, Inc.	Telovations, Inc.	R	R
941	WI	Conceirge Telecom	Open Air Wireless		P	NR
942	WI	Sonic Spectrum Internet Services	Sonic Spectrum Internet Services		P	P
943	WI	Starwire Technologies	Starwire Technologies		P	NR

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
949	WI	MegaPath Corporation	MegaPath Corporation		O	P
953	WI	Wonderwave.net Internet, Inc.	Wonderwave.net Internet, Inc.		P	P
110000	WI	BAYNET INC	BAYNET INC		X	
110001	WI	BETTER WORLD TELECOM LLC	BETTER WORLD TELECOM LLC		X	
110002	WI	COON VALLEY TELECOMMUNICATIONS INC	COON VALLEY TELECOMMUNICATIONS INC		N/A	NP
110003	WI	American Tower Corporation	ATC OUTDOOR DAS LLC		X	
110004	WI	Atlantis Holding	Wisconsin RSA #7 Limited Partnership		N/A	NP
110005	WI	Bay Communications Inc.	Baycom Inc		R	R
110006	WI	BORDERLAND COMMUNICATIONS LLC	BORDERLAND COMMUNICATIONS LLC		P	V
110007	WI	Broadcore, Inc.	Broadcore, Inc.		R	R

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
110010	WI	BullsEye Telecom, Inc.	BullsEye Telecom, INnc.		R	R
110011	WI	CANNON TELEPHONE COMPANY	CANNON TELEPHONE COMPANY		P	NR
110012	WI	CIMCO Communications, Inc.	CIMCO Communications, Inc.		P	NR
110017	WI	Cyber Broadcasting LLC	Cyber Broadcasting LLC		N/A	NP
110018	WI	CyberLynk Network	CyberLynk Network		N/A	NP
110024	WI	Genesis Wireless	Genesis Wireless		N/A	NP
110025	WI	GenisysNotWiresInternet	Blast Communications		N/A	NP
110026	WI	Grant Wireless	Grant Wireless		N/A	NP
110027	WI	Hiercomm Networks	Hiercomm Networks		P	NR
110030	WI	Hughes Communications, Inc.	HughesNet		X	

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
110031	WI	Interlink Computers Technology Inc.	UP Logon		P	NR
110033	WI	LightEdge Solutions, Inc.	LightEdge Solutions, Inc.		N/A	NP
110034	WI	MITEL NET SOLUTIONS INC	Inter-Tel NetSolutions		O	NC
110035	WI	Net Cable	Net Cable		N/A	NP
110038	WI	NOBELTEL LLC	NOBELTEL LLC		R	R
110039	WI	NORSTAR TELECOMMUNICATIONS, LLC	NORSTAR TELECOMMUNICATIONS, LLC		R	R
110041	WI	Open Range	Open Range		X	
110042	WI	Phoenix PC Service	Phoenix PC Service		N/A	NP
110043	WI	PHONE1 INC	PHONE1 INC		R	R
110044	WI	Q-Comm Corporation	Windstream (PKA-Norlight Inc .PKA-Cinergy Communications		O	NC

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
			Company)			
110045	WI	Ridge Runner Internet Services	Ridge RuNner Internet Services		N/A	NP
110046	WI	RIDLEY TELEPHONE COMPANY LLC	RIDLEY TELEPHONE COMPANY LLC		R	R
110049	WI	Sharon Telephone Company (IL & WI)	Sharon Telephone Company - CLEC		P	V
110050	WI	SILV COMMUNICATION INC	SILV COMMUNICATION INC		R	R
110051	WI	SIMICOMM LLC	SIMICOMM LLC		R	R
110052	WI	Siren Telephone Company	SIREN COMMUNICATIONS		P	V
110053	WI	DCS Netlink	Skywalk Wireless		R	R
110054	WI	SPECTROTEL INC	SPECTROTEL INC		N/A	NP
110056	WI	StealthNet	StealthNet		X	

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
110059	WI	TON SERVICES INC	TON SERVICES INC		R	R
110060	WI	TOUCHTONE COMMUNICATIONS INC	TOUCHTONE COMMUNICATIONS INC		R	R
110061	WI	TRI-M COMMUNICATIONS INC	TRI-M COMMUNICATIONS INC		R	R
110062	WI	U.S. TELECOM LONG DISTANCE INC	U.S. TELECOM LONG DISTANCE INC		R	R
110063	WI	UNION INFORMATION SYSTEMS, LLC	UNION INFORMATION SYSTEMS, LLC		R	R
110064	WI	UNI-TEL COMMUNICATIONS GROUP INC	UNI-TEL COMMUNICATIONS GROUP INC		R	R
110066	WI	Verizon Business Global LLC	Verizon Business		O	NC
110067	WI	Verizon Wireless PKA Rural Cellular Corporation	MINNESOTA SOUTHERN WIRELESS CO		P	V
110068	WI	VerizonClearwave	VerizonClearwave		N/A	NP
110071	WI	WilTel Communications, LLC.	Level 3		P	V

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
110073	WI	WISCONSIN RSA #5 CORP	WISCONSIN RSA #5 CORP		P	NR
110075	WI	WOODMAN TV CABLE SYSTEM	WOODMAN TV CABLE SYSTEM		N/A	NP
110081	WI	RICHLAND CENTER ELECTRIC UTILITY	RICHLAND CENTER ELECTRIC UTILITY		X	
110082	WI	Cache Valley Wireless	Cache Valley Wireless		N/A	NP
110084	WI	SCA Cable Inc.	Solarus		P	V
110087	WI	Telephone Associates Inc	Telephone Associates Inc		X	
110089	WI	WOW!Internet and Cable	WOW!Internet and Cable		N/A	NP
110090	WI	Ethoplex	Ethoplex		O	U
110098	WI	Dish Network	Dish Network	Dish Network	R	R
110107	WI	North East Iowa Telephone Co.	North East Iowa Telephone Co.		N/A	NP

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
110115	WI	Manawa Telecom Video	Manawa Telecom Video		N/A	NP
110116	WI	Upper Pennisula Communications	Upper Pennisula Communications		N/A	NP
110120	WI	Reallinx, Inc.	Reallinx, Inc.	Reallinx, Inc.	R	R
110121	WI	Earthlink	Earthlink	EarthLink	O	NC
110122	WI	Birch Communications Inc.	Birch Communications Inc.	Birch Communications Inc.	N/A	NP

West Virginia Geological and Economic Survey

State Broadband Mapping Methodology

For the State of West Virginia, April 2013

Contents

Overview

This document provides a summary of the data collection, normalization and verification processes used by the State of West Virginia (State) up to the seventh data submission, in April 2013, to the National Telecommunication and Information Agency (NTIA) in accordance with the State Broadband Data Development (SBDD) program. Most of the processes used in this data submission remained the same as ones for the previous submissions. The State of West Virginia interactive broadband map continues to provide the broadband coverage information to the public and is able to receive comments and feedback from consumers and citizens of the state. In January 2013, West Virginia expanded their verification effort to include wireless coverage and network facility field validation.

Purpose

This documentation was developed to illustrate the processes used during the data collection, normalization and verification processes. The information within this document will provide a background to the development of the provider list and data request, and specific issues encountered by West Virginia regarding data collection, normalization and validation.

Data Sources

Provider List

The provider list for this seventh round of data collection started during the first round of data collection. For this round, the list was regenerated to include any new providers within the State. The list was created by contacting the West Virginia Cable Telecommunications Association, the West Virginia Public Services Commission (PSC) and the West Virginia Broadband Deployment Council. The State receives an updated provider list from the PSC every six months. This information was compiled and compared against the list from the Federal Communications Commission (FCC). Providers were then contacted using information provided by the FCC's public information search Web tool. Providers who were contacted during the first round of data were contacted again through the same name and address. If a provider contacted during the first round had given more detailed contact information for a specific individual, those individuals were contacted instead of the contact provided by the FCC.

The provider list is updated every six months to reflect any mergers or acquisitions that have occurred. There are some legal issues when a merger occurs, but the data integration does not occur until up to a year later. In those circumstances, the data is kept separate until a full merger occurs.

Data Gathering

Provider Data Request

This component of the project was heavily reliant on working with service providers to obtain data. Each identified provider was mailed a standard data request outlining the elements identified in the Notice of Funds Availability (NOFA) Technical Appendix that were requested from providers. This request included information regarding the availability of broadband services, technology used to provide them, the location of certain broadband infrastructure and the speed of the service. Depending upon the technology each respective provider used to provide service, West Virginia requested that served areas be reported in one of the following manners: census blocks and street segments, service area boundaries or qualified address points (wireline providers); tower data that could be used to develop viewsheds (fixed wireless providers); or terrain-adjusted coverage shapefiles (fixed and mobile wireless providers). If a provider was unable to fulfill such requirements, the West Virginia Geological and Economic Survey (WVGES) worked with those providers to gather the necessary data in an alternative approach. An updated guide for broadband data submission, previously developed by the State, continued to be circulated to providers this round as a supplement to the data request. Along with this guide, a letter

outlining the continued overall goals of the broadband mapping program and the objectives of the new updated guide were sent to each provider. The guide was developed to continue to standardize the data received from providers, including modifications and updates that have been made to the requirements by the NTIA since the original Technical Appendix. Examples of the letter and guide are provided in Appendix A and Appendix B in this document. All of the providers that submitted census block information for this submission provided census 2010 geometry or census block numbers. However, once again, no providers submitted TIGER/Line Record Identification (TLIDs) for roads as described within the guide. Without TLIDs, roads need to be hand selected or geocoded, which can lead to some additional processes and inaccuracies because of the limitations described in the Geocoding Issues section.

After the initial data request was mailed, follow up phone calls and emails were made to remind providers of due dates and to collect any missing or unclear data. As of this submission, the response rate from providers continues to be greater than 90 percent. After data was received, the data was normalized per NTIA standards and placed into the provided geodatabase. The WVGES continued to operate under the same assumption as used in the first round of data gathering. The WVGES let the data "speak for itself" and did not make any grand assumptions or estimates in the interest of maintaining clean and accurate data.

Providers submitted only maximum advertised speed data. Providers have not been very willing to submit typical speed data as the typical speeds are generally lower than the advertised speeds. Advertised speed data was given by all providers and then pushed to typical speeds as per NTIA's advice in the Round 3 data review conference call.

In addition to the data request, each provider was required to sign a Nondisclosure Agreement (NDA) between themselves and WVGES. The NDA outlined how provider data would be handled and what portions of that data would be considered confidential, which would be shared with the NTIA and which were to be made publically available.

Coverage Information

Data was derived and normalized into four formats in accordance with the data model:

- Census blocks (2010) of two or less square miles
- Street segments (2010) of census blocks greater than two square miles
- Address level (geocoded point data)
- Wireless area (shapefile)

The normalization procedures were as follows:

- Determine service being provided – what technologies are being used to provide the service
- Understand data/determine how to process – determine which feature class in the geodatabase data belongs
- Georeference/geocode necessary data – georeference data for wireless area coverage and other service area maps, as well as geocode address level data
- Segregate data into NOFA compliant formats – completely filling in geodatabase fields, as well as making sure topology is correct
- Provide quality assurance/quality control (QA/QC) – verification and validation of data

Typically there were two main types of data supplied for normalization – service area maps and flat Excel tables.

Service areas were georeferenced, digitized and then intersected with the master blocks and roads files. These blocks and road segments were then loaded into the geodatabase and the additional company specific data was appended to those records.

Flat Excel tables were exported to a database and then joined with the Federal Information Processing Standard Identification (FIPS ID) for the block files and the TLID for the roads files. The joined fields were exported and then imported into the

database. The NTIA has not required this information and in cases where a TLID was not given by the provider there was much greater difficulty and inaccuracy as roads had to be geocoded and hand selected.

Geocoding Issues

The West Virginia Statewide Addressing and Mapping Board (SAMB) information is not yet completed across all of the counties in West Virginia, leaving areas within the State without complete or verified address information. This led to low geocoding match rates of provider supplied information, especially in rural areas, throughout the data normalization workflows. For some of these areas, additional broadband coverage processes were used to derive coverage estimates described in the next section.

Other Issues

Another issue of incomplete broadband coverage was due to the acquisition of Verizon by Frontier. When Frontier submitted digital subscriber line access multiplexer (DSLAM) locations for the April 1, 2011 deadline, it did not include the entire Verizon infrastructure. Frontier has since re-submitted its DSLAM locations for the October 1, 2011 deadline, which now should include those missing Verizon DSLAMs, and the coverage map has been extended into certain areas that were not previously included.

Additional Data Processing Techniques

Because of geocoding inconsistencies in certain areas of the State, some provider address information could not be mapped and other data processing techniques had to be implemented to create broadband coverage estimates. In cases where DSLAM points were able to be provided, broadband coverage was mapped by loading the DSLAM points into Environmental System Research Institute's (ESRI's) Network Analyst. For this processing, the West Virginia State SAMB street centerlines were used as the source roads. The DSLAM points were loaded into the facilities point feature class of the service area template using a 1000 foot snapping tolerance to help locate points to nearest roadway. Any points still not connecting to the road network were viewed and manually linked to the road network. Processing was run to create segment lines for each point and to create a detailed polygon area around each street segment area for each point. Distance parameters used and speeds applied varied per DSLAM, according to the facility information providers supplied. No impedances were placed on the streets.

Once the process was run, the created segment lines were linked to the original DSLAM point attribute table and exported from the analyst dataset into a line feature class. Segments derived from DSLAM points that plotted inside the wire center boundaries were clipped to the boundary features. Segments that derived from DSLAM points that plotted outside the wire center boundaries were not clipped out of concern that the wire center dataset may not accurately reflect updated boundaries. The segment feature class was used to select covered census blocks and street segments for the data submission.

Starting with the April 2013 submission, to increase the accuracy of coverage selected through DSLAM network development, roads attributed with the following Master Address File (MAF)/TIGER Feature Class Codes (MTFCCs) were excluded from network creation:

MTFCC Code	Description
S1500	Vehicular Trail
S1630	Ramp
S1710	Walkway/Pedestrian Trail
S1820	Bike path or trail
S1830	Bridle path
S1740	Private road for service vehicles

This resulted in a net feature (blocks/segments) decrease from the Round 6 submission, affecting both Frontier West Virginia, Inc. and Citizens Telecommunications Company of West Virginia.

One of the foremost issues of the fourth round of data collection, submitted in October 2011 was converting to 2010 Census Blocks. The NTIA's decision to switch to 2010 Census Blocks did not leave much time during that data collection window to notify providers of the change. Many providers submitted 2000 Census Blocks, not 2010 Census Blocks. The conversion led to multiple inaccuracies between Round 3 and Round 4 submissions because of the problems intersecting 2000 Census Blocks with 2010 Census Blocks and errors of commission. Many block boundaries had been redrawn and the crosswalk file provided by the Census was in a very unwieldy format and not much help. For this seventh round submission, most of the providers submitted 2010 Census Block information and with the previous submission base data having been already converted to 2010 Census Block information, the processing techniques for 2010 Census Blocks has become integrated into the long-term maintenance process.

Prior to this seventh submission, another unique processing issue occurred when providers submitted address-level fixed wireless data which would produce error through the new data model. As per discussion with NTIA, the unlicensed fixed wireless points were plotted and then buffered out to 800 feet. A shapefile was created and moved to the wireless feature class within the geodatabase. For this April 2013 submission, computerized radio propagation studies were used to predict coverage for StratusWave service areas. Site location information, as well as equipment and antenna system data was provided by StratusWave engineers. This information was utilized in wireless network engineering software to create propagation prediction models using the Anderson 2D propagation model and 10 meter digital terrain elevation data. Median signal levels (50 percent time and 50 percent location variability) are predicted and then an additional margin (Prediction Confidence Margin) is incorporated to account for performance objectives and environmental losses. The propagation prediction models were then exported to map data which indicates StratusWave predicted coverage areas to include in the data submission.

Federal Communications Commission Registration Number Discrepancies

Discrepancies between Round 2 and Round 3 data submissions were noticed concerning FCC Registration Numbers (FRNs). Effected providers were contacted directly to clear up these issues. The FRNs that were loaded into the database come from direct contact with providers. The FRNs are verified as a continued validation process during each data collection period.

Community Anchor Institutions

The process used to identify the Community Anchor Institutions was based on the information provided by NTIA. This included the categories of schools K-12, libraries, medical/healthcare, Public Safety, higher education and other community support consisting of either government or nongovernmental facilities.

All public schools in West Virginia were used for the K-12 category. Libraries consisted of all public libraries throughout West Virginia. Medical/healthcare included hospitals, nursing homes and primary care centers. The primary care centers are made up of main locations of the primary care centers along with satellite clinics and school-based health centers. Public Safety consisted of West Virginia police departments along with the correctional facilities and juvenile centers, fire departments and 9-1-1 centers. Higher education consisted of public and private universities located across West Virginia. The community support consisted of courthouses, regional development centers and workforce locations.

There was a cutoff created to focus on identifying main facilities as Community Anchor Institutions (CAIs). However, if there is a need to include more facilities, the State is open to adding those facilities for future updates.

The following agencies were contacted for information: West Virginia (WV) Department of Education, WV Library Commission, Hospitals located throughout the state, Nursing Homes located throughout the State, WV Division of Primary

Care, WV Primary Care Association, WV 9-1-1 Center Directors, WV Emergency Management Directors, WV Regional Jail Authority, WV Higher Education Policy Commission, WV Courthouse Facility Improvement Authority, WV Workforce, WV Regional Development Centers and county addressing coordinators.

Data was collected and verified by the West Virginia Division of Homeland Security. Surveys were sent out to various facilities and included a section where their primary city-style address could be filled in. For those facilities that returned the survey, the statewide addressing and mapping data that the counties provided was used as a way to verify the address. Once the location was verified the latitude and longitude coordinates were added. In cases where surveys were not returned, the statewide addressing and mapping data was used to determine if the information could be matched. If this wasn't possible, then the Internet was used to find a Webpage with additional information. If this method was not successful, attempts were made to contact the facility directly. Currently, there is approximately a 90-95 percent match rate for the location of the CAIs.

Since the October 2011 data submission, additional surveys were sent by mail to healthcare facilities and fire, police and ambulance locations throughout the state. This amounted to approximately 1,500 surveys that were mailed out. Based on the information that was received back from the surveys, the primary city-style address, broadband technology, speeds and other attributes associated with the community anchor institution feature class were verified and updated where necessary. An on-line survey was released since the last data submission with the objective of receiving further updates and also getting the survey, and also emailing the survey to those locations where the survey sent by mail was returned by the United State Postal Service due to invalid address information or a facility having changed location. The survey was successful in collecting additional missing attribute information for some of those CAI locations but there are still locations where attributes are missing that did not respond to the survey. Additional methodologies to collect this final missing information will be reviewed and another approach to communicate with these specific CAIs will be undertaken prior to the next data submission. For the April 2012 submission, there were additional community anchor institution locations that are included in the map due to the NTIA allowing some 'unknown' classifications for attributes within the community anchor institution feature class.

Validation and Verification

Throughout the data gathering and data preparation processes for each data submission, the data verification has been continuous and has evolved based on the evolution of the data model. The focus has been on getting complete data from all providers and assuring that all data can be processed into the required data model for submission. Where providers did not submit data in acceptable formats for data normalization into NOFA formats or where they did not submit complete data or any data, there has been continued focus on working with the providers by WVGES to continue to improve the source information being provided. Data verification and validation is an on-going, long term process that will continue to evolve throughout the broadband data development program. Additional data verification methods, beyond what has been implemented to date, continue to be evaluated to refine the map, where applicable.

This seventh submission incorporated further refinement to validate the provider supplied information against the Census 2010 geographies, submitted address points, and wireless coverage polygons. Limited research was performed for specific areas of the map where any user feedback points to a gap in coverage or an over-estimate in coverage. The research was limited due to a small sampling of user feedback at this time. Plans to advertise surveys and the interactive broadband map continue to be executed and are described further in other sections of this document.

A confidence scale, which scores submission data according to a series of accuracy and consistency checks, was developed in January 2013. Rankings will be used to identify and prioritize areas where additional verification and validation techniques (e.g. consumer and business surveys) might be employed. The confidence scale will be applied to coverage datasets from the seventh round starting in the spring of 2013. A pilot area will be established to begin applying the confidence scale and test the results to determine that the criteria provides adequate results to highlight areas that might require more follow-up with specific providers.

West Virginia began a comprehensive pilot validation project in January 2013, focused on identifying gaps and over-representations in the wireless coverage data, and verifying the existence of provider-reported network facilities. The pilot testing project is described below, and took place in a three-county study area (Marion, Monongalia and Preston counties).

Mobile wireless coverage validation was conducted by drive-testing the study area, and collecting coverage and speed data using specific app-enabled smart phones provided by the State. Quality of Service (QoS) Solutions smart phone applications were used for the pilot test. The purpose of the testing was to assess the spatial and attribute accuracy of the service area polygons that two providers, AT&T and nTelos, submitted to West Virginia as part of the Round 6 data collection effort. Comparisons between the field data collected and the provider-supplied service area polygons facilitated the identification of possible coverage and speed inaccuracies reported to the State by the providers. The pilot results are being analyzed and a plan is being developed to expand the testing to other areas of the state.

Central Office (CO) validation was conducted through a combination of field testing and comparisons against other data sources of known high spatial accuracy. Provider-submitted facilities were mapped according to latitude/longitude coordinates, and those that plotted within the study area were compared against both the WVSAMB 2011 structure layer and the WVSAMB imagery. Facilities that were confirmed during this initial verification phase were then field validated during drive testing. Because block and segment coverage for facility-supplying providers is derived from CO and Remote Terminal (RT) locations, CO spatial accuracy is a direct reflection of coverage accuracy for these providers.

Validation Processes

Data validation begins within the data collection process to determine if the data submission by providers is formatted in a way that can be normalized into the required NOFA formats. Where data is deemed incomplete or in non-conforming standards, WVGES staff reached out to providers as necessary to improve the data submissions. After each round of data preparation the format for the updates being collected has improved.

Quality assurance and quality control has been a big focus of the data validation of the submittals assuring that the required data fields are populated properly and that data fields are populated with values that follow the data model rules. As the data model has evolved over each round of data submission these QA/QC checks have been modified to include the changes in fields, values, domains, etc. that are being required for submission.

Validation methods employed include the following:

- Assuring all applicable providers' datasets are propagated forward to each round of data collection
- Verifying that all required fields are populated with valid values and default values are used when appropriate. This includes:
    - Speeds valid for the technologies reported
    - Latitude/longitude coordinates fall within an acceptable range, given the state boundaries
    - The relationships between maximum and typical, and downstream and upstream speeds are valid
    - Service reported at the block level is done using blocks of the appropriate size (less than two square miles)
    - Speeds and technologies reported per provider are consistent between blocks and segments
    - Administrative information (provider name, doing business as [DBA] Name, FRN) is consistently reported per provider in each populated feature class.

Outreach to Providers

To further assure the providers' broadband footprints would be accurately represented in data submissions, "check maps" depicting each respective provider's served small census blocks and segments located in large blocks were distributed back to providers, along with the data request letters in January of 2013. Providers were requested to either approve their check maps as-is, or submit additional changes if their coverage was not accurately represented. No coverage corrections were received as a result of this effort.

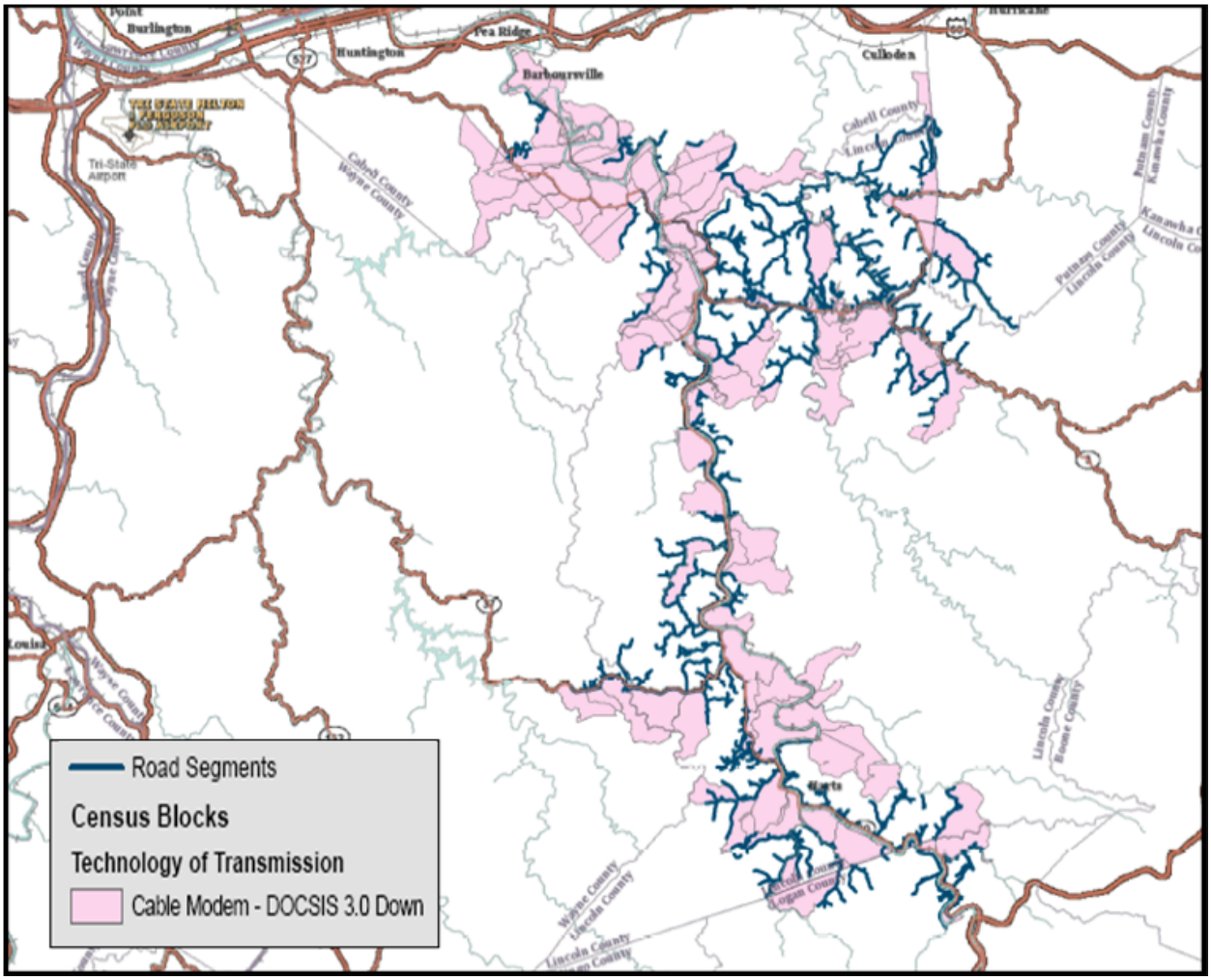

Figure 1—Example of a Portion of a Provider Check Map

The validation process for the October 2012 submission includes the use of the Python scripts for validation provided by NTIA.

Third Party Datasets

As data collections and data normalization processes progressed, additional validation was conducted using commercially available datasets. The following commercially available datasets were used as a reference for the specific technologies that their data represented.

- American Roamer datasets
- TeleAtlas Exchange boundaries
- Media Prints Cable boundaries

These datasets were used primarily as a validation source for provider service coverage.

State Broadband Interactive Map

The State of West Virginia released its interactive broadband mapping Website to the public in May 2011. The Website address is www.wvbroadbandmap.org. The Website provides consumers the opportunity to review broadband availability across the State.

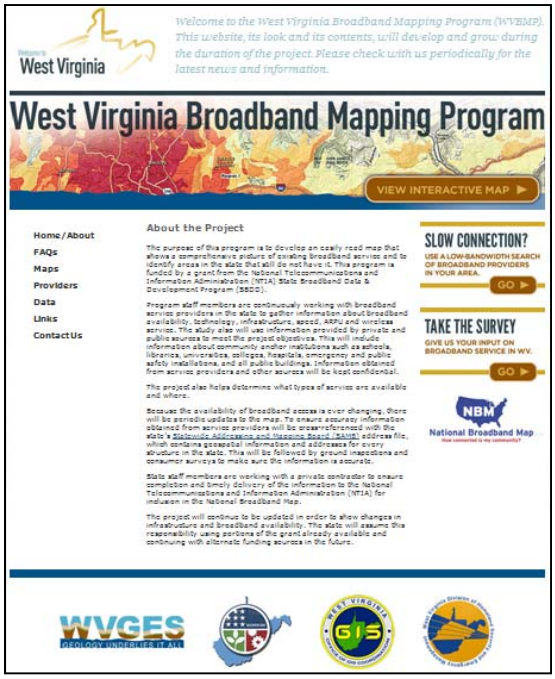

Figure 2—WVBMP Main Landing Page

The main landing page for the West Virginia Broadband Mapping Program (WVBMP) provides background information on the program, contact information and a frequently asked questions section. The landing page has the main link to the broadband coverage map and a link to an address lookup tool for users with slow Internet connections. This will allow them to view what coverage is available around their address or zip code without needing to view the entire map, which may not be feasible for users that may still be on dial-up connection speeds. By having this slow Internet connection coverage tool, it allows feedback from those consumers even if they do not have the capabilities to bring up the interactive map application.

The Web application has the functionality for consumers and citizens using the State broadband map Web application to submit comments and feedback. The information gathered from that feedback is being reviewed as more potential source information for validating and determining confidence levels of the broadband coverage across the regions of the State. By comparing comments supplied by consumers about broadband availability to the broadband coverage, trends could be recognized where potential inconsistencies in the existing broadband map could exist. This could delineate the need for further focused validation or verification in specific areas that could refine the broadband coverage information for future data submissions.

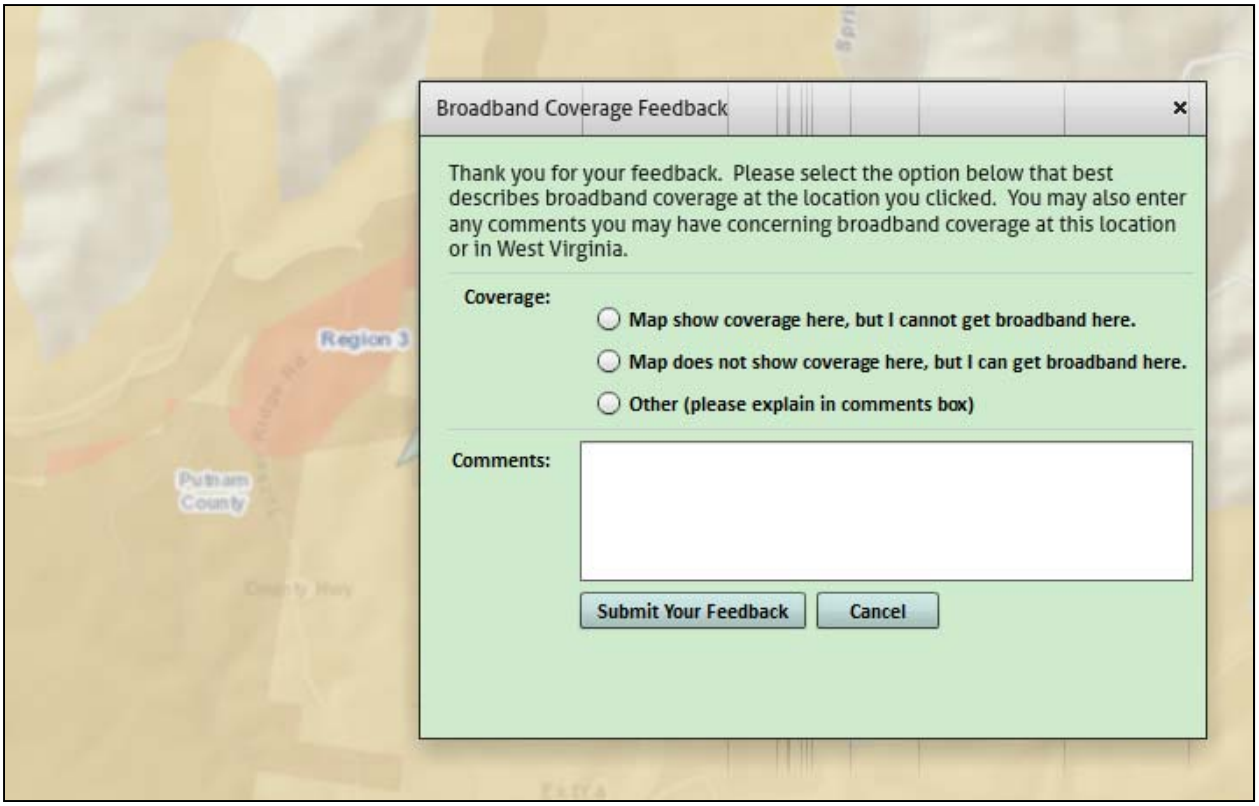

Figure 3—Example of Feedback Tool Interface

For users that can browse the interactive map, they can click on any location on the map and choose to provide specific feedback for that location. This will store the coordinate information of the location that they selected allowing them to choose from a couple of coverage categories for their comment or choose other. Within the feedback tool, they can enter more specific details about their broadband coverage.

After the initial release of the broadband map, there was some initial feedback and comments mainly pertaining to a few areas that were not showing coverage. The feedback indicated that there should be coverage or scenarios where we were showing coverage. One resident made a comment that there was no cable service on a particular road or area. Some of the missing coverage was due to the acquisition of Verizon by Frontier as discussed above.

The State continues to implement plans to incorporate more advertising to the interactive broadband map and feedback tools. Continuing to work more closely with the regional planning councils to review coverage in their communities, a plan to include an advertisement of the interactive broadband map into local phone bills is being developed.

A speed test has been developed within the WVBMP interactive Website. The design of the Website includes links to the speed test developed using the Ookla broadband speed test tools. The speed test is embedded within a broadband survey wizard that allows consumers to provide specific information that will help the State analyze information about use and demand for broadband within the State. To get more users to take the speed test to obtain more results for analysis over the next six months, the speed test will be advertised along with the interactive Website. Speed test results and statistics will be leveraged to compare against the existing broadband coverage and help validate speed information. As stated previously, this could assist in determining if there are any trends or patterns in the information that could be an additional tool for prioritizing areas where more refined verification and validation might need to occur. To date there is still a lack of substantial data collected via the speed-test or surveys to be able to detect patterns or trends and continued planning within the regional

planning councils could provide more exposure to the Websites and speed test at the grass roots level. Links to the speed test and the interactive map have also been added to additional Websites, including a new West Virginia Broadband Deployment Council Website (www.broadband.wv.gov) that was launched at the end of 2011.

Future Steps for Validation

As part of continued broadband planning activities and future validation of data, a third party dataset from Infogroup has been purchased. For broadband map validation, the Infogroup datasets provide consumer broadband use information including coordinate based location information along with provider name and technology that is being used by that particular consumer. The Infogroup data will allow the consumer information to be plotted on the map and compared against existing coverage maps to determine if there are any trends within the Infogroup data that help to determine where additional validation needs to occur. For example, there may be clusters of consumer points for a particular provider that exist in an area of the State where there is no coverage for that provider. The goal would be to identify the major patterns or trends that might need to be re-visited with a provider, if data appears to be missing.

During the summer of 2012, as part of the data verification tasks, a comparison was performed between the State broadband coverage area from the State's last data submission to the NTIA in April 2012 with the third party information from Infogroup purchased by the State. An Excel spreadsheet was provided by Infogroup and contains customer location information for cable, digital subscriber line (DSL), fiber optic (fiber), and wireless subscribers and can be converted into a spatial geographic information system (GIS) dataset. The findings were used to indicate whether or not there are any areas in the submitted broadband coverage data that may need to be updated or verified.

Also present in the spreadsheet table is customer location information for dialup subscribers. This dataset can be converted into a spatial GIS layer and used to identify areas that may not have broadband services, but can still access information through a dialup service.

When comparing the current broadband coverage area and the new XY point layer from the Infogroup records, only a small percentage of points fell outside of the coverage area. Table 1 highlights the key results that were found.

Type of Service	Total Number of Points	Number of Points Outside of Coverage Area	Number of points Within 50 ft of Coverage Area	Number of points Over 500 ft of Coverage Area
Cable	108,503	303	60	92
DSL	63,462	268	69	64
Fiber	428	4	1	1
Wireless	4,962	54	2	25
Total	177,355	629	132	182

Table 1—Points Outside of Coverage Area by Technology

In conclusion, the analysis of the dataset indicates that no immediate changes need to be made to the existing broadband coverage area because of the low percentage of points that fell outside of the current coverage areas. The few clusters of points that fell outside of the current coverage area should be reviewed and potentially discussed with providers in those areas to determine if any existing coverage needs to be expanded in those areas. This will be incorporated within the data submission request period for the next data submission.

Another dataset that is being considered for purchase for broadband planning activities and broadband demand analysis is Telogical's broadband statistical datasets that provide pricing information. Included in the datasets is information on broadband maximum advertised speed by providers which could help validate some of the speed data within the broadband mapping datasets.

Throughout the broadband data development program, as addressing information from the State Addressing and Mapping Board's addressing datasets are continually updated, address point information from providers will continually be re-verified prior to each submission to NTIA to improve geocoding results and refine the broadband coverage areas.

Continued Verification Objectives for 2013

The West Virginia Broadband Mapping Program had outlined specific objectives for data verification in the latter half of 2012 and into 2013. These objectives are focused on five main components:

1. Begin development of a plan for integration of Public Data Sources for verification activities
2. Begin development of a plan to compile free wireless broadband services offered and operated by a government, business, or community entity
3. Continue verification activities by revisiting contacts for each anchor institution and developing verification strategy for data with which we are less confident
4. Continue to refine a confidence scale that indicates the level of confidence for each record
5. Obtain speeds at the block/segment level

To achieve these objectives as outlined to NTIA in the West Virginia Broadband Mapping Program activities for 2012, the West Virginia Office of GIS Coordination (WVOGC) began to implement some of the following tasks in late 2012 and early 2013.

- Receive the current FCC Form 477 data from the WVOGC and provide comparisons to the round 6 submission data to determine if there are additional build out by providers that need to be requested for the round 7 submission. This round marked the first time that U.S. Cellular participated in the data collection effort.
- Use service availability query tools published on providers' Websites to compare to what has been submitted
- Began compilation of free wireless broadband services offered and operated by a government, business, or community entity. Research information on Websites and applications that list free Wi-Fi hotspots. Further field verification of these hotspots through a pilot test is described in a separate section of this document. This layer was compiled for the pilot area during the wireless coverage field verification project timeline. The Wi-FI hotspots GIS layer will be added to the interactive map to provide residents of the State and visitors information that will allow them to locate businesses or community centers that provide free access to Wi-Fi.
- Review submitted wireline attributes (Central offices, remote terminals, etc.) and compare locations as submitted by providers to any visible location information on orthophotos or against of any facilities coded in the State Addressing and Mapping Board (SAMB) data. Additional field verification was completed in pilot area testing described in this document.

Additional objectives will continue to be reviewed and considered in 2013 such as the following:

- Launch another outreach campaign to resellers to determine if they want to be included on the State Web map in some capacity and determine the best approach to adding those resellers.
- Work with WVOGC and the West Virginia of Department of Homeland Security and Emergency Management (WVDHSEM) to launch an outreach campaign to have community anchor institutions take the speed test and take a specific survey developed for community anchors beyond what has already been surveyed and collected so far by WVDHSEM.

- Obtain speeds at the block/segment level. Research the currently available options for obtaining more detailed speed information, including third-party source data, and providing recommendations to WVOGC.
- Continue to mine information from the speed tests and develop new campaigns to encourage the use of the speed test.

Field verification pilot test:

To achieve the long-term success of specific verification tasks outlined above as the project continues into 2014, a field verification pilot test of a three-county study area was conducted during the first quarter of 2013. This pilot test involved the following activities:

- Using mobile applications on smart phones or laptops to test wireless broadband availability and speeds, and verifying the locations of Central Offices
- Collecting and verifying locations of Wi-Fi hotspots and free public broadband to help compile of map of these locations

After analyzing the results of the field verification pilot testing and determining that the project produced useful information, the State decided to expand these verification activities beyond these pilot areas. An implementation plan is currently being developed for expanding field verification activities to a larger geographic area.

Use of Broadband Mapping Datasets for State Broadband Grant Program

The West Virginia Broadband Deployment Council launched a State grant program in the summer of 2012 to help bring affordable broadband to unserved areas of West Virginia. One of the most important ways it does this is by providing grants to help fund broadband deployment projects. Broadband deployment projects can be one of two types – infrastructure and demand stimulation. Infrastructure projects are those that bring affordable broadband service to people and businesses that do not currently have it and may never have it without some sort of public funding. Demand stimulation projects are those that help people and businesses understand and value the benefits broadband service would bring to them, and cause them to want to use that service. To help delineate specific potential project areas, as described in the West Virginia Code 31-15C-1, the broadband mapping coverage that has been developed as part of the NTIA's broadband mapping program was used to generate maps that depicted Type 1, 2 and 3 areas outlined in that statute.

A Type 1 unserved area is an area in which broadband may be deployed by service providers in an economically feasible manner. A Type 2 unserved area is an area in which broadband may be deployed by broadband service providers and other entities in an economically feasible manner, provided some form of public money is made available. A Type 3 unserved area is an area in which, at present, cable or wireline broadband cannot be deployed in an economically feasible manner and an intermodal approach employing other technologies, such as satellite and wireless, is required to provide that area with high-speed internet access.

Broadband service providers each have unique processes for determining when it is economically feasible to deploy broadband service to a given area. The process varies from provider to provider and depends greatly on the technology being deployed. Because no consistent formula exists and the definition of a Type 1, 2 or 3 unserved area is not strictly defined, an objective means to classify unserved areas based upon known metrics for populations more likely to have broadband service today. Metrics regarding current broadband deployment were obtained from Federal Communications Commission (FCC) reports. Factors including structure points, population density, median income, age, distance from existing networks and terrain were considered in classifying un-served areas as Type 1, 2 or 3.

The known areas currently served by broadband service providers were documented from the State broadband mapping program through the GIS coordinator's office and the WVGES. Areas currently served by broadband service were excluded from the determination. Unserved areas were then subdivided based on proximity to structure points and road segments.

Each area was then correlated with 2000 and 2010 census data for population density, income and population age to determine likelihood for deploying broadband service.

Criteria used to determine the likelihood of a given area receiving broadband service was based on metrics provided by the Broadband Adoption and Use in America, Omnibus Broadband Initiative (OBI) Working Paper Series No. 1, by John B. Horrigan for areas where broadband is currently deployed. Specific categories considered in the determination included population density, population age, income and proximity to existing networks. Each category was weighted on a scale of one to five, with a score of five indicating a high likelihood to receive broadband service and a score of one indicating a low likelihood to receive broadband service. Based on the average of the four considered categories, each subdivided area was classified as Type 1, 2 or 3.

Based on the determination, a map was developed which depicts the Type 1, 2 and 3 classifications across the State. A 1,000 foot boundary was included within the documented area around each structure point to reflect the area that a wireline provider may be willing to lay cable from a roadway in order to provide broadband service. Served areas are reflected with a yellow color. Each unserved area is color classified according to the Type 1, 2 and 3 determinations.

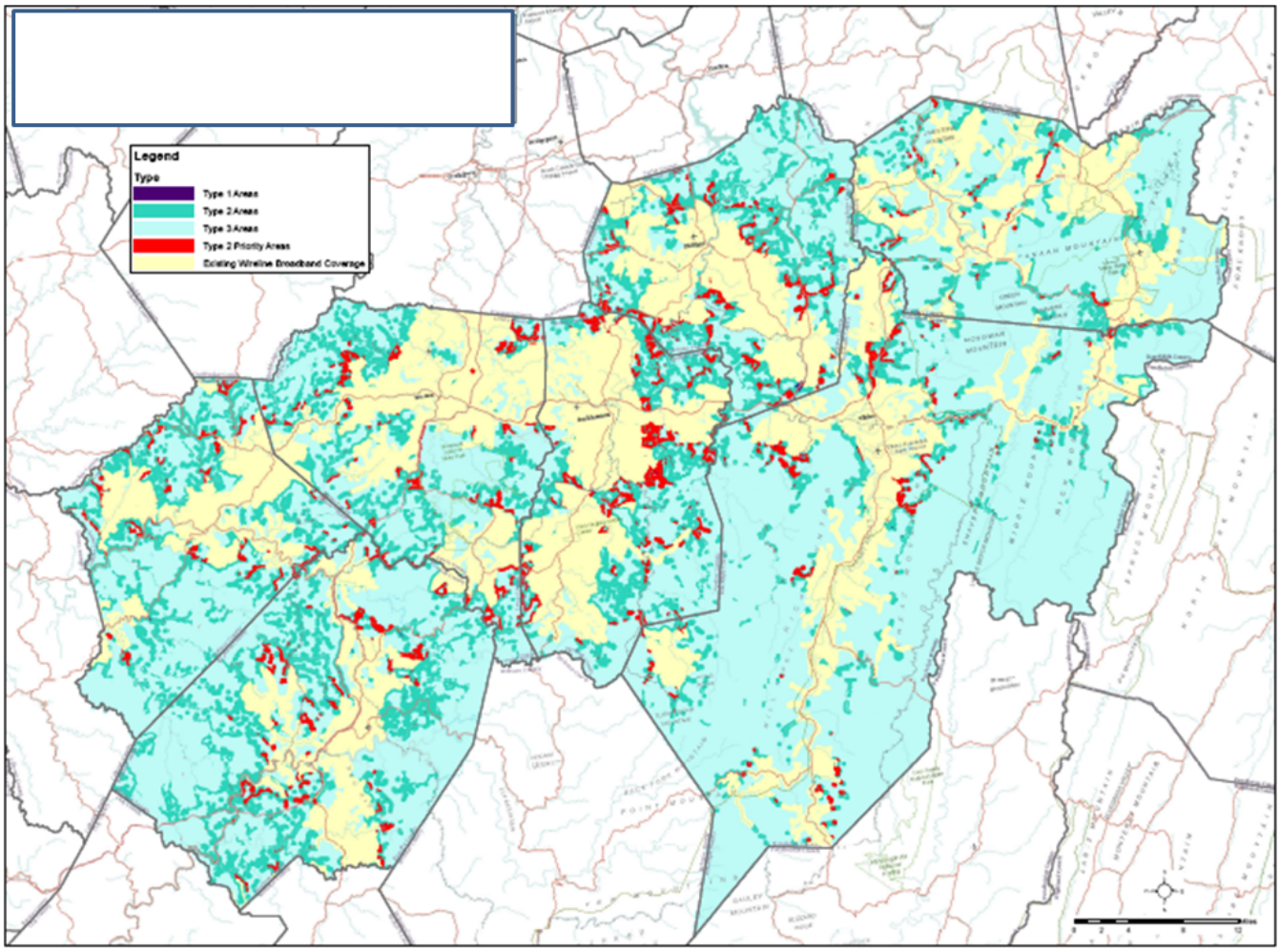

Figure 4—Sample of a Type 1, 2 and 3 Map

Providers

Non-Responsive Providers

Names of providers who were non responsive will be passed along to the WVGIS Coordinator's Office to be contacted again.

Atlantic Broadband LLC

DBA: Atlantic Broadband, LLC
FRN: 0009596883
This provider was contacted eight times. Data was not provided by the October submittal date. Further attempts at data gathering will be made in the next round of data collection.

**SkyWeb, Inc

DBA: SKYWEB Inc.
FRN: 0018516799
**Tower locations were provided along with additional information for each tower site. Two computerized propagation studies were performed to approximate coverage for a local provider supplying broadband data. The two studies were predicted in the 900 MHz and 2.4 GHz bands that are utilized at these locations. The data was received from the provider that defined the tower sites currently utilized to provide coverage. Parameters provided include site locations, ground elevation, transmit power, antenna height above ground and antenna gain. All of these components were compiled into EDraw Max (EDX) Signal software program that calculates the associated link budget and in which the program takes into account terrain and land use land clutter (LULC). Propagation studies show potential coverage throughout the area. Additional assumptions made include a predicted reliability of 90 percent for any signal received by a device and no additional signal loss was taken into account for signals received inside buildings which may further impact the coverage predictions. Coverage areas based on the propagation studies do not seem to represent realistic coverage patterns and will need to be reviewed again with SkyWeb, Inc. in the future.

Satellite Providers

Data requests sent to Satellite providers were met with the response of "We provide to the entire State." Attempts made at gathering more detailed data sets were unsuccessful for this round of data collection. Further attempts will be made for the next round of data collection.

Hughes Communications, Inc.

DBA: HNS License Sub, LLC
FRN: 0018483073
Detailed data was not provided by the April submittal date. Further attempts at data gathering will be made in the next round of data collection.

StarBand Communications Inc.

DBA: StarBand Communications Inc.
FRN: 0005087457
Detailed data was not provided by the April submittal date. Further attempts at data gathering will be made in the next round of data collection.

WildBlue Communications, Inc.

DBA: WildBlue Communications, Inc.
FRN: 0007843766
Detailed data was not provided by the April submittal date. Further attempts at data gathering will be made in the next round of data collection.

Provider that Submitted Data

Provider Name	DBA Name	FRN
Armstrong Holdings, Inc.	Armstrong Telephone Company - Northern Division	0004311528
Armstrong Holdings, Inc.	Armstrong Telephone Company-WV	0004379731
Armstrong Holdings, Inc.	Armstrong Utilities, Inc.	0003765617
AT&T Inc	New Cingular Wireless Services, Inc.	0003766532
Broadview Networks Holdings, Inc.	Broadview Networks Holdings, Inc.	0010296853
Blue Devil	Blue Devil	0003749116
Cequel Communications, LLC	Suddenlink Communications	0015784663
Citizens Communications Company	Frontier Communications Corporation	0003576352
City of Philippi	City of Phillipi	0001984244
Comcast Corporation	Comcast Cable Communications Inc.	0003768165
Community Antenna Service, Inc.	Community Antenna Service Inc.	0004966131
Deutsche Telekom AG	T-Mobile USA, Inc.	0006945950
Gateway Telecom, LLC	Gateway Telecom LLC	0018536623
Hardy Telecommunications, Inc.	Hardy Telecommunications Inc	0002008043
Hardy Telecommunications, Inc.	Hardy Telecommunications,Inc CLEC	0013169313
Hickory Tech Corporation	Enventis Telecom Inc.	0008394322
Inter Mountain Cable, Inc.	Inter-Mountain Cable Inc	0001789080
Inter Mountain Cable, Inc.	Mikrotec CATV, LLC	0014471288
JB-Nets	JB-Nets	0016474868
Leap Wireless International, Inc.	Cricket Communications, Inc.	0002963528
Level 3 Communications, LLC	Level 3 Communications, LLC	0003723822
Level 3 Communications, LLC	Broadwing Communications, LLC	0008599706
LightEdge Solutions, Inc	LightEdge Solutions, Inc.	0015546443
Metropolitan Telecommunications Holding Company	Metropolitan Telecommunications Holding Company	0009806019
Micrologic, Inc.	Micrologic, Inc.	0018675256
New Edge Holding Company	New Edge Network, Inc.	0003720471
NTELOS, Inc.	NTELOS Communications Inc.	0004342762
NTELOS, Inc.	West Virginia PCS Alliance, L.C.	0002049328
Otelco Inc.	War Acquisition Corp	0018657858
Qwest Communications International, Inc.	Qwest Communications Company, LLC	0003605953
Shenandoah Telecommunications Company	Shentel Cable Company	0018024075
Sprint Nextel Corporation	Sprint Nextel Corporation	0003774593
Spruce Knob Seneca Rocks Telephone, Inc.	Spruce Knob Seneca Rocks Telephone, Inc.	0004337002
TelAtlantic, Inc.	West Side Telecommunications	0002009405
TelAtlantic, Inc.	Communications Plus, Inc.	0009281262
Time Warner Cable LLC	Time Warner Cable LLC	0013430244
TW Telecom inc.	tw telecom holdings inc.	0014942668

Provider Name	DBA Name	FRN
United States Cellular Corporation	U.S. Cellular	0004372322
Verizon Communications Inc.	Cellco Partnership	0018506568
Verizon Communications Inc.	Verizon Business Global LLC	0010856284
Verizon Communications Inc.	Verizon West Virginia Inc.	0002011278
Visual Link Internet LLC	Visual Link Internet LLC	0017645813
WVVA.NET	WVVA.NET	0018473223

Table 2—Providers That Have Submitted Data for SBDD Program

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Appendix A WVGES Provider Data Request Letter

The WVGES Provider Data Request Letter can be found on the following page.

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WEST VIRGINIA
GEOLOGICAL AND ECONOMIC SURVEY

1 Mont Chateau Road
Morgantown, WV 26508-8079

Earl Ray Tomblin, *Governor*
Keith Burdette, *Secretary, Department of Commerce*
Michael Ed. Hohn, *Director and State Geologist*

Phone: (304) 594-2331
Fax: (304) 594-2575
E-mail: info@geosrv.wvnet.edu
Web Site: http://www.wvgs.wvnet.edu

January 3, 2013

Re: Data Request in Compliance with the State Broadband Data and Development Grant Program and the Broadband Data Improvement Act

Response Requested by March 1, 2013

Dear:

The West Virginia Geological and Economic Survey (WVGES) must collect certain data regarding the availability of broadband services, technology used to provide them, and the location of certain broadband infrastructure. The WVGES is required to provide the collected data to the NTIA every six months beginning March 2010 until October 2014. Entities that provide broadband service, as defined below, on either a commercial or noncommercial basis within West Virginia are subject to this request.

WVGES was designated as the single West Virginia entity eligible to receive a grant under the Broadband Data Improvement Act of 2008 (BDIA), 47 U.S.C. §§ 1301-04. In 2009, the WVGES successfully applied to the National Telecommunications and Information Administration (NTIA) for such a grant, pursuant to the NTIA's Notice of Funds Availability (NOFA).

The NTIA's State Broadband Data and Development Grant Program Notice of Funds Availability, Docket No. 0660ZA (July 8, 2009) (NOFA), defines broadband as follows:

> …two-way data transmission to and from the Internet with advertised speeds of at least 768 kilobits per second (kbps) downstream and at least 200 kbps upstream to end users, or providing sufficient capacity in a middle mile project to support the provision of broadband service to end users…

Please note that the broadband inventory maps derived from these data may result in government-subsidized broadband deployment in unserved and underserved areas. Providers that do not respond may face subsidized competition in areas they already serve.

Attached to this request are the Technical Appendix to the NOFA and a technical appendix written by the WVGES to clarify the data that needs to be collected. **Please note this appendix is new as of January 1, 2012.** These documents outline the broadband availability information WVGES is required to collect. Every broadband service provider within the state of West Virginia is expected to provide the information specified in the attached documents to WVGES **no later than March 1, 2013**, in the format WVGES has specified.

Six Month Update:
Pursuant to the BDIA and the NOFA, WVGES must collect updates on broadband data on a six month rolling basis. **If you had submitted adequate information during the 2nd collection period of 2012 and there are no changes to your infrastructure, the WVGES requests a letter stating such**. If infrastructures changes have been made in the interim period, submissions of the changes are required.

Contact Information:
Please submit the requested data **no later than March 1, 2013** by CD or DVD to Michael "Ty" Clifford, West Virginia Geological and Economic Survey, 1 Mont Chateau Rd. Morgantown WV 26508-8079.

If you have questions about this request, contact Michael "Ty" Clifford by email at mclifford@geosrv.wvnet.edu, or by phone at (304) 594-2331.

Nondisclosure Agreement:
Data submitted to WVGES in response to this request will be protected under the confidentiality requirements set forth in Section 106 (h)(2) of the BDIA. This section states that, "[n]ot withstanding any provision of Federal or State law to the contrary, an eligible entity shall treat any matter that is a trade secret, commercial or financial information, or privileged or confidential, as a record not subject to public disclosure except as otherwise mutually agreed to by the broadband service provider and the entity." Further, the NOFA states that "[a]s a measure to protect the confidential or proprietary nature of the information received from broadband service providers and other organizations during the data collection phase, awardees may execute nondisclosure agreements (consistent with applicable law) that require awardees to treat any matter that is a trade secret, commercial or financial information, or privileged or confidential, as a record not subject to public disclosure except where mutually agreed upon by the information provider and the awardee, provided, however, that any such nondisclosure restriction a) will not restrict the providing of all data collected under this Program to NTIA, nor b) restrict NTIA's use of such data as contemplated under this Notice (including sharing such data with the FCC or other federal agencies)". NTIA expects awardees to enter into such agreements upon the request of the service provider. WVGES believes that these provisions will protect the confidentiality of information that broadband providers submit pursuant to this request and intends to enter into a nondisclosure agreement with any provider that wishes to do so.

Michael Ed Hohn
Director and State Geologist
West Virginia Geological and Economic Survey

Additional information may be obtained from the NOFA, available at 74 Fed. Reg. 32,545 or online at http://broadbandusa.sc.egov.usda.gov.

Enclosures:

- Letter from Gov. Joe Manchin III to Mr. Larry Strickling, Administrator NTIA (August 12, 2009)
- State Broadband Data and Development Grant Program, Notice of Funds Availability; clarification (August 7, 2009). Available at http://broadbandusa.sc.egov.usda.gov/ broadband_mapping.htm
- WVGES Guide to Broadband Submission January 1, 2012
- Coverage area check map for review

Appendix B WVGES Guide to Broadband Submission

The WVGES Guide to Broadband Submission can be found on the following page.

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WEST VIRGINIA
GEOLOGICAL AND ECONOMIC SURVEY

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January 3, 2013

West Virginia Geological and Economic Survey Guide to Broadband Submission

Purpose:
Several changes in submission guidelines have been made by NTIA since the writing of the original Technical Appendix. This document clarifies what is preferred and required for submission and the original NTIA Technical Appendix no longer adequately describes what is required.

Broadband definition:
Broadband Service is the provision, on either a commercial or noncommercial basis, of data transmission technology that provides two-way data transmission to and from the Internet with advertised speeds of at least 768 kilobits per second (kbps) downstream **and greater than 200 kbps upstream** to end users, or providing sufficient capacity in a middle mile project to support the provision of broadband service to end-users within the project area.

2010 census requirements:
Beginning in June 2011, all census block and road information **must be derived from 2010 Census Data**. All block and road data submitted **must have a unique identifier present**, such as census block # or **TLID.**
The WVGES has created two shapefiles which contain all census blocks in West Virginia less than 2 square miles and all roads contained in census blocks greater than 2 square miles. All census and road data must correspond to these master files.

The shape files are located at:
https://dssfm.kimballdata.com

```
Username: censusdata
Password: censusdata#1
```

Data preferences:
The WVGES prefers data to be submitted in the following order of preference:

- ESRI shapefile format with all required fields submitted.
- Service area boundary with defined speeds and fields that can be converted to blocks and roads.
- Flat Excel or comma-delimited files that contain all data field and unique identifiers.

Data Types and required fields:

Wireless Services not Provided to a Specific Address – Shapefile

Facilities-based providers of wireless broadband service that is not address specific (e.g., nomadic, terrestrial mobile wireless, or satellite), may provide WVGES with GIS-compatible shapefiles depicting areas in which broadband service is available to end users.

For this purpose, an "end user" of broadband service is a residential or business party, institution, or state or local government entity that may use broadband service for its own purposes and that does not resell such service to other entities or incorporate such service into retail Internet-access service. Internet Service Providers (ISPs) are not "end users" for this purpose. An entity is a "facilities-based" provider of broadband service connections to end user locations if any of the following conditions are met: (1) it owns the portion of the physical facility that terminates at the end user location; (2) it obtains unbundled network elements (UNEs), special access lines, or other leased facilities that terminate at the end user location and provisions/equips them as broadband; or (3) it provisions/equips a broadband wireless channel to the end user location over licensed or unlicensed spectrum.

For this purpose, "broadband service" is "available" at a location if the provider does, or could, within a typical service interval (7 to 10 business days) without an extraordinary commitment of resources, provision two-way data transmission with advertised speeds of at least 768 kilobits per second (kbps) downstream and greater than 200 kbps upstream to end-users at that location. The data shall be submitted to WVGES as an ESRI Shapefile such that the associated data contains the following fields:

- Instructions for providers needing to obtain a FRN can be accessed at https://fjallfoss.fcc.gov/coresWeb/publicHome.do.
- All map areas must be closed, non-overlapping polygons with a single, unique identifier.
- Any variation in any of the required fields necessitates the creation of a separate closed, non-overlapping polygon.
- In the area covered by each polygon, subscribers must have broadband service with the speed characteristics shown in the data record 95% of the time to within 50 feet of the polygon's boundary.
- The technology of transmission should be entered as an integer based on the coding scheme shown below.
- The speed tiers should be entered as integers according to the reference in below.
- The data must be expressed using the WGS 1984 geographic coordinate system.
- Maps must be accompanied by metadata or a plain text "readme" file that contains a comprehensive explanation of the methodology employed to generate the map layer including any necessary assumptions and an assessment of the accuracy of the finished product.
- Since ESRI Shapefiles typically consist of 5 to 7 individual files including the associated metadata and geodatabase, data for the entire state or territory should be submitted as a single, zipped file containing all the component files. The file should be named "area_availability_XX.zip" where XX is the two-letter postal abbreviation for the state or territory.

Record Format for Availability Area Data for Each Provider – Use Only in Connection with Wireless Services not Provided to a Specific Address

Field	Description	Type	Example
Provider Name	Provider Name	Text	ABC Co.
DBA Name	"Doing-business-as" name	Text	Superfone, Inc.
FRN	Provider FCC Registration Number	Integer	8402202
Technology of Transmission	Category of technology for the provision of service (see details following Part 1(a) for codes)	Integer	41
Spectrum Used	If technology of transmission is wireless, is Cellular spectrum (824-849 MHz; 862-869) used to provide service (Y/N)?	Text	Y
Spectrum Used	If technology of transmission is wireless, is 700 MHz spectrum (698-758 MHz; 775-788 MHz; 805-806 MHz) used to provide service (Y/N)?	Text	Y
Spectrum Used	If technology of transmission is wireless, is Broadband Personal Communications Services spectrum (1850-1915 MHz; 19301995) used to provide service (Y/N)?	Text	Y
Spectrum Used	If technology of transmission is wireless, is Advanced Wireless Services spectrum (1710-1755 MHz; 2100-2155) used to provide service (Y/N)?	Text	N
Spectrum Used	If technology of transmission is wireless, is Broadband Radio Service/Educational Broadband Service spectrum (2496-2690 MHz) used to provide service (Y/N)?	Text	N
Spectrum Used	If technology of transmission is wireless, is Unlicensed (including broadcast television "white spaces") spectrum used to provide service (Y/N)?	Text	N
Spectrum Used	If technology of transmission is wireless, but the spectrum used to provide service is not listed above, please identify as one of the following: Specialized Mobile Radio Service (SMR) (817-824 MHz; Spectrum Used 862-869 MHz; 896-901 MHz; 935-940 MHz), Wireless Text SMR Communications Service (WCS) spectrum (2305-2320 MHz; 2345-2360 MHz), 3650-3700 MHz, Satellite (L-band, Big LEO, Little LEO, 2 GHz).	Text	SMR
Maximum Advertised Downstream Speed	Speed tier code for the maximum advertised downstream speed available (see details following Part 1(a) for codes)	Integer	8

Maximum Advertised Upstream Speed	Speed tier code for the maximum advertised upstream speed that is offered with the above maximum advertised downstream speed available (see details following Part 1(a) for codes)	Integer	8
Typical Downstream Speed	Speed tier code for the downstream data transfer throughput rate that most subscribers to service at the maximum advertised downstream speed (above) can achieve consistently during expected periods of heavy network usage (see details following Part 1(a) for codes).	Integer	8
Typical Upstream Speed	Speed tier code for the upstream data transfer throughput rate that most subscribers to service at the maximum advertised upstream speed (above) can achieve consistently during expected periods of heavy network usage (see details following Part 1(a) for codes).	Integer	8

Middle Mile and Backbone Interconnection Points

In addition to the information shown in the tables below, awardees shall provide NTIA with a list of interconnection points of facilities in their state that provide connectivity between (a) a service provider's network elements (or segments) or (b) between a service provider's network and another provider's network, including the Internet backbone. (Collectively, (a) and (b) are "middle-mile and backbone interconnection points").

Middle-mile and backbone interconnection points typically enable relatively fast data rates, are built to handle substantial capacities, and may be service-quality assured.

Examples might include: points of interconnection enabling communications between an incumbent local exchange carrier central office and the Internet, between a cable aggregation point (headend) and the Internet, or between a wireless base station and the provider's core network elements that connect to other networks including the internet.

These data shall be submitted to NTIA as a tab-delimited text file in which each record has the following format:

- Instructions for providers needing to obtain a FRN can be accessed at https://fjallfoss.fcc.gov/coresWeb/publicHome.do.
- The capacity of the serving facility should represent the capacity as currently configured and be expressed according to the following reference:
- Coordinates must be expressed using the WGS 1984 geographic coordinate system.
- Data for the entire state or territory should be submitted as a single, tab-delimited plain text file named "middlemile_XX.txt" where XX is the two-letter postal abbreviation for the state or territory.

Record Format for Middle-Mile and Internet Backhaul Connection Points Data for Each Provider

Field	Description	Type	Example
Provider Name	Provider Name	Text	ABC Co.
DBA Name	Doing-business-as name	Text	Superfone, Inc.
FRN	FCC Registration Number	Integer	8402202
Ownership	Is the facility owned (0) or leased (1)?	Integer	0
Serving Facility Capacity	Serving capacity of transport facility (see details below)	Integer	1
Serving Facility Type	Type of transport facility (1=Fiber; 2=Copper; 3=Hybrid Fiber Coax (HFC); 4=Wireless)	Integer	1
Latitude	Latitude in decimal degrees	Float	38.88456
Longitude	Longitude in decimal degrees	Float	-77.028123
Elevation	Elevation relative to grade to the nearest foot (positive integers indicate above grade, negative below grade)	Integer	-10

Serving Facility Codes

Data Rate Code	Interconnection Point Data Rate
1	Multiple T1s and less than 40 mbps
2	Greater than 40 mbps and less than 150 mbps
3	Greater than 150 mbps and less than 600 mbps
4	Greater than or equal to 600 mbps and less than 2.4 gbps
5	Greater than or equal to 2.4 gbps and less than 10 gbps
6	Greater than or equal to 10 gbps

Service Address Service Associated with Specific Address

For each facilities-based provider of broadband service to specified end-user locations in their state, awardees shall provide NTIA with a list of all addresses at which broadband service is available to end users in the provider's service area, along with the associated service characteristics identified below.

For this purpose, "broadband service" is the provision, on either a commercial or noncommercial basis, of data transmission technology that provides two-way data transmission to and from the Internet with advertised speeds of at least 768 kilobits per second (kbps) downstream **and greater than 200 kbps upstream** to end users, or providing sufficient capacity in a middle mile project to support the provision of broadband service to end-users within the

project area.

For this purpose, an "end user" of broadband service is a residential or business party, institution or state or local government entity that may use broadband service for its own purposes and that does not resell such service to other entities or incorporate such service into retail Internet-access services. Internet Service Providers (ISPs) are not "end users" for this purpose. An entity is a "facilities-based" provider of broadband service connections to end user locations if any of the following conditions are met: (1) it owns the portion of the physical facility that terminates at the end user location; (2) it obtains unbundled network elements (UNEs), special access lines, or other leased facilities that terminate at the end user location and provisions/equips them as broadband; or (3) it provisions/equips a broadband wireless channel to the end user location over licensed or unlicensed spectrum.

For this purpose, "broadband service" is "available" at an address if the provider does, or could, within a typical service interval (7 to 10 business days) without an extraordinary commitment of resources, provision two-way data transmission to and from the Internet with advertised speeds of at least 768 kilobits per second (kbps) downstream and greater than 200 kbps upstream to endusers at that address. The list of addresses shall be submitted to WVGES as a tab-delimited text file in which each record has the following format:

- All fields are required.
- Instructions for providers needing to obtain a FRN can be accessed at https://fjallfoss.fcc.gov/coresWeb/publicHome.do.
- The ID field is a sequential integer ranging from 1 to the total number of addresses.
- Address data fields should be space-delimited in standardized Postal Service form. See http://pe.usps.gov/cpim/ftp/pubs/Pub28/pub28.pdf.
- Categories of end users should be entered as integers based on the following table.
- For reporting the technology of transmission, report the technology used by the portion of the connection that terminates at the end-user location. If different technologies are used in the two directions of information transfer ("downstream" and "upstream"), report the connection in the technology category for the downstream direction. The technology of transmission should be entered as an integer based on the following tables.
- Speed tiers should be entered as integers based on the following tables.
- Data for the entire state or territory should be submitted as a single, tab-delimited plain text file named "address_availability_XX.txt" where XX is the two-letter postal abbreviation for the state or territory.

Record Format for Address Data for Each Provider

Field	Description	Type	Example
Provider Name	Provider Name	Text	ABC Co.
DBA Name	"Doing-business-as" name	Text	Superfone, Inc.
FRN	Provider FCC Registration Number	Integer	8402202
ID	Sequential record number	Integer	1

End User location/Service Data End-User Address	Complete address	Text	1401 Constitution Ave NW Washington DC 20230
End-User Building Number End-User Prefix Direction	Building number Prefix direction	Text	1401
End-User Street	Street name	Text	Constitution
End-User Street Type End-User Suffix Direction	Street type Suffix direction	Text	Avenue NW
End-User City	City	Text	Washington
End-User State Abbreviation	Two-letter state postal abbreviation	Text	DC
End-User ZIP Code	5-digit ZIP code (with leading zeros)	Text	20230
End-User ZIP Plus 4	4-digit add-on code (with leading zeros)	Text	0005
Category of End User	Category of End User Served at Address (see details below for codes)	Integer	3
Technology of Transmission	Category of technology available for the provision of service at the address (see details below for codes)	Integer	50
Maximum Advertised Downstream Speed	Speed tier code for the maximum advertised downstream speed available at the address (see details below for codes)	Integer	8
Maximum Advertised Upstream Speed	Speed tier code for the maximum advertised upstream speed that is offered with the above maximum advertised downstream speed available at the address (see details below for codes)	Integer	8
Typical Downstream Data	Speed tier code for the downstream data transfer throughput rate that most subscribers to service at the maximum advertised downstream speed (above) can achieve consistently during expected periods of heavy network usage (see details below for codes)	Integer	8

Typical Upstream Speed	Speed tier code for the upstream data transfer throughput rate that most subscribers to service at the maximum advertised upstream speed (above) can achieve consistently during expected periods of heavy network usage (see details below for codes)	Integer	8

End User Codes

End User Category Code	End User Category	Description
1	Residential	Address denotes a residential living unit, individual living unit in institutional settings such as college dormitories and nursing homes and other locations designed primarily for residential use at which broadband service is available.
2	Governmental	Address denotes a state orl ocal govermnent location at which broadband service is available.
3	Small Business	Address denotes the location of a small business.
4	Medium or Large Enterprise	Address denotes the location of a medium or large enterprise.
5	Other	Address denotes a location not meeting any of the above descriptions.

Technology of Transmission Codes

Technology Code	Description	Details
10	Asymmetric xDSL	
20	Symmetric xDSL	
30	Other Copper Wireline	All copper-wire based technologies other than xDSL (Ethernet over copper and T-1 are examples)
40	Cable Modem - DOCSIS 3.0	
41	Cable Modem - Other	

50	Optical Carrier/Fiber to the End User	Fiber to the home or business end user (does not include "fiber to the curb")
60	Satellite	
70	Terrestrial Fixed Wireless - Unlicensed	
71	Terrestrial Fixed Wireless - Licensed	
80	Terrestrial Mobile Wireless	
90	Electric Power Line	
0	All Other	Any specific technology not listed above.

Speed Tier Codes

Upload Speed Tier	Download Speed Tier	Description
1	--	Less than or equal to 200 kbps
2	--	Greater than 200 kbps and less than 768 kbps
3	3	Greater than or equal to 768 kbps and less than 1.5 mbps
4	4	Greater than or equal to 1.5 mbps and less than 3 mbps
5	5	Greater than or equal to 3 mbps and less than 6 mbps
6	6	Greater than or equal to 6 mbps and less than10 mbps
7	7	Greater than or equal to 10 mbps and less than 25 mbps
8	8	Greater than or equal to 25 mbps and less than 50 mbps
9	9	Greater than or equal to 50 mbps and less than 100 mbps
10	10	Greater than or equal to 100 mbpss and less than 1 gbps
11	11	Greater than or equal to 1 gbps

Census Blocks Less than Two Square Miles

Record Format for Wireline Service by Census Block

(For Census Blocks no greater than two square miles in area in which broadband service is available to end users)

Field	Description	Type	Example
Provider Identification Data			
Provider Name	Provider Name	Text	ABC Co.
DBA Name	"Doing-business-as" name	Text	Superfone, Inc.
FRN	Provider FCC Registration Number	Integer	8402202
ID	Sequential record number	Integer	1

Census Block Identification Data			
Census Block FIPS Code	15-digit Federal Information Processing Standard (FIPS) Code identifying individual Census Block. Must include leading "0"	Integer	60750160001015
Census Block Square Mileage	Provide square mileage for specific census block number to the first decimal place	Number	1.8
Broadband Technology and Speed Data			
Technology of Transmission	Category of technology available for the provision of service at the address (see details below for codes)	Integer	50
Typical Downstream Speed	Speed tier code for the downstream data transfer throughput rate that most subscribers to service at the maximum advertised downstream speed (above) can achieve consistently during expected periods of heavy network usage (see details below for codes)	Integer	8
Typical Upstream Speed	Speed tier code for the upstream data transfer throughput rate that most subscribers to service at the maximum advertised upstream speed (above) can achieve consistently during expected periods of heavy network usage (see details below for codes)	Integer	8

Roads contained within Census Blocks greater than two square miles

Record Format for Wireline Service by Street Segment

(For Census Blocks larger than two square miles in area in which broadband service is available to end users)

Field	Description	Type	Example
Provider Identification Data			
Provider Name	Provider Name	Text	ABC Co.
DBA Name	"Doing-business-as" name	Text	Superfone, Inc.
FRN	Provider FCC Registration Number	Integer	8402202
ID	Sequential record number	Integer	1

End User location/ Service Data			
Census Block FIPS Code	15-digit Federal Information Processing Standard (FIPS) Code identifying individual Census Block	Integer	60750160001015
Census Block Square Mileage	Provide square mileage for specific census block number to the first decimal place	Number	5.8
Street Name	Provide street name to identify street segment	Text	Van Ness
Street Type	Street type to identify street segment	Text	Avenue
Street Direction Prefix	Street Prefix to identify street segment	Text	N
TLID	Unique identifier for each street segment	Text	0015874962
Broadband Technology and Speed Data			
Technology of Transmission	Category of technology available for the provision of service at the address (see details below for codes)	Integer	50
Typical Downstream Speed	Speed tier code for the downstream data transfer throughput rate that most subscribers to service at the maximum advertised downstream speed (above) can achieve consistently during expected periods of heavy network usage (see details below for codes)	Integer	8
Typical Upstream Speed	Speed tier code for the upstream data transfer throughput rate that most subscribers to service at the maximum advertised upstream speed (above) can achieve consistently during expected periods of heavy network usage (see details below for codes)	Integer	8

State Broadband Initiative Mapping Methodology

For the State of Wyoming
Revised March 31, 2013

CostQuest Associates

LinkAMERICA Alliance

Contents

Overview

This document provides an overview of how the seventh required data set was collected and processed for the State Broadband Initiative (SBI) in the state of Wyoming.

This submission builds upon prior efforts to increase in-state broadband mapping and planning capacity. Although each state has taken a slightly different path to building in house capacity, this cross-state partnership helps the LinkAMERICA team focus on comparable outcomes across the four states, where appropriate and support each state based upon the State's elected transition path. Our intent is not to make the states look and be the same, rather it is to leverage economies of scope and scale among the business processes while at the same time pursuing the longer term goal of transitioning sustainable program leadership to the respective states.

Work continues to shift to state partners. Much of this focuses upon the capacity building, planning and technical assistance components of the program. One immediate result of this is that in some of our states in-State partners have taken direct responsibility for the survey, validation and development of Community Anchor Institution information. The methods by which CAI data were developed are included as Appendix One. During this fourth program year we have one in State partner taking over the state web presence, both in terms of content and hosting. We also have States hiring in dedicated resources to support the program.

As expected, this document rests heavily on the prior drafts but has also been updated and expanded.

Significant changes include additions covering:

1. Trends in provider inputs
2. Modification to internal provider tracking
3. Increases in the amount of WISP coverage using propagation estimates or coverage obtained from Towercoverage.com
4. Requested changes based upon NTIA guidance
    a. Review of submitted speed with respect to NTIA supplied frequency table
    b. Review of NTIA speed guidelines, coverage processing and provider documentation
    c. Inclusion of Provider Universe Table (Appendix 4)
    d. Expansion of verification methods summary table
5. Transition planning with respect to capacity building within the State for Broadband map development (even while the technical data development components of the program continue to rest with CostQuest and the LinkAMERICA Alliance).

Treatment of the following subjects has been expanded:

1. Verification and validation
2. Data production methods
3. Provider advertised speed and coverage validation

As anticipated, the SBI program continues to mature and evolve. Technical leadership and strong program office guidance has been appreciated. We continue to focus resources on establishing stable business processes to track submissions, verify received and processed data, test for temporal stability and provide reporting deliverables consistent with NTIA expectations.

In our view, the mapping deliverable reflects (1) a good faith effort, which results in a reasoned response to the NOFA, Technical Appendix A, as well as supplementary program office guidance and modifications offered in phone calls, emails, and webinars, (2) a stable foundation for improvement and prioritization of both NTIA and state needs and interests , (3) a valid data processing model to support online mapping, consumer feedback, provider verification and reporting, and finally, (4) a valid use of the evolving data transfer model and its intrinsic validation methods. More importantly, the resulting data and online coverage maps that follow from this work are providing good input and context for the Broadband planning teams working across the states we have the pleasure to serve.

We also note that the mapping deliverable is increasingly important to state and federal policy makers as each assesses the policy ecosystem that supports the advancement of broadband access and adoption.

We close this methodology document with 4 appendices. Appendix 1 refers to efforts related to Community Anchor Institutions. Appendix 2 describes data collection challenges. This section describes some of the open issues, challenges and questions we are exploring. Our hope is to receive clarification and counsel from NTIA in how best to confront some of these issues, which are likely common across states. Appendix 3 describes the confidentiality framework explained by NTIA. Appendix 4 details the provider universe, those providers found to be non-NOFA compliant and those providing data.

Purpose of This Manual

This technical document was developed to provide transparency in our data production process.

Our goal is to illustrate a thoughtful process designed to meet the intent of the submission. Our hope is that we have developed a process that is reasonable, with respect to the data it deals with, as well as flexible enough to change with evolving NTIA requirements and lessons learned from the Broadband mapping community.

Data Sources

Developing the Provider List

Broadband provider lists for all states were developed from the following sources:

- Prior comparable mapping/research efforts
- State lists of regulated telecommunications, cable and wireless service providers
- State and national industry organizations (i.e. cable associations, wireless service provider organizations, telecommunications associations)
- FCC Form 477 respondents
- Third party data sources such as Warren Media, Media Prints, American Roamer Coverage Right, GeoResults Wirecenter Boundaries and TowerCoverage.com.
- Independent web searches
- Interviews with key state staff members and important community influencers

As one would expect in a dynamic marketplace, provider identification is an ongoing and important component of our work. Mergers and acquisitions, the use of multiple regional DBAs, the lack of any universal identity management attribute, and the generally complex parent-subsidiary structure of many telecommunications companies, make provider identification and tracking very challenging. Because of this dynamic environment, the Provider list is reviewed on an on-going basis and changes are made as necessary to ensure that the list remains current.

At the start of each round, email and telephone contact is made to all known providers. This time consuming, but necessary, process ensures that the list of contact persons remains current, and that providers are aware of data request changes and deadlines associated with each round. This also provides an initial read out if corporate policy has changed impacting willingness to submit updated information. Where necessary, we execute new NDAs with providers. We maintain this communication with providers throughout the Data Collection period, providing multiple paths and opportunities for participation in the program. Providers that respond too late to be included in the final dataset are flagged for inclusion in the next submission. Unresolved data concerns are also flagged and tracked so that we can begin working on a plan for resolution prior to the next data collection round.

As contact is made in each round, we qualify each provider by asking a series of questions regarding the type of service and speeds offered. If the provider does not meet the minimum specifications for a

Broadband provider (as defined in the NOFA) we make a note of the change in status.[1] Providers remain on our list and are included in program communications so that in the event that their service is upgraded or expanded their status can be updated accordingly.

Provider Outreach

To meet the program's aggressive deadlines and participation goals, LinkAMERICA believes it is critical to maintain rapport with providers. To do this we reach out to providers with regular project communications, including a program newsletter and links to the various State mapping websites. In several states we have participated in trade association and policy summits.

As described above, individual e-mails and/or telephone calls are made to all providers explaining the status of the program and requesting their continued support. In some instances we've also had the opportunity to support providers in their BTOP / BIP applications. Through these collective outreach initiatives, and our engagement with various industry associations, we continue to enjoy a healthy and appropriate relationship with Broadband service providers.

NDA

To provide protection for all parties involved, LinkAMERICA continues to honor the terms of our NDA. If providers did not execute the NDA in previous rounds they were offered the opportunity to do so in this collection round. New providers were of course also supplied with a copy of the NDA.

To facilitate the execution of NDA's, LinkAMERICA continues to use the DocuSign online document management solution. This system allows providers to review and digitally sign the NDA in a legally binding manner, and has been instrumental in achieving rapid approval and execution of NDAs with the majority of providers. In some cases, NDA's were individually negotiated to address specific provider concerns. In all cases, minimum standards established by the NOFA are honored. In other cases, providers chose to submit data without executing an NDA.

Provider Survey

Since six prior rounds of data collection have been completed, the LinkAMERICA team has a solid base of coverage and speed information with which to begin Round 7. This allowed us to provide flexible response options to participating providers. One option allowed them to review check maps of their coverage and speed data – submitting only corrections and additions to the existing dataset. (For provider convenience the check maps were created in both PDF and Google Earth (.KMZ) formats.) The second option was to allow submittal of completely new datasets, either in tabular form or in multiple other digital formats. For those without CAD or GIS systems, we continued to allow the submittal of printed/scanned maps and other written materials.

[1] As with other Grantees, we struggle with appropriate and consistent classification for service providers who opportunistically provision Broadband services. In this submission we continue to bring them into the analysis as a provider type "other". As the inclusion of this category isn't our primary goal, we are working to process data as we can. We are similarly categorizing and retaining reseller information. Appendix 4 illustrates the categorization of non Broadband providers within our provider tracking and verification systems.

Survey Methods

Once again, we used a secure digital survey process (via our provider portal websites) to collect and display information for providers. The Round 7 survey process was designed to accommodate both new and returning providers, and the different types of information they would be submitting. The following is a summary of the process encountered by each group:

New providers: New providers were routed directly to our standard survey where they were provided with templates for uploading data in tabular NTIA-compliant formats. As in previous rounds, if providers could not supply information in the requested format, alternatives were offered. These alternatives included uploading service-area boundary maps, exchange area maps, CAD drawings or customer address lists. From that information, the LinkAMERICA team developed a geographic representation of coverage and was able to build coverage features for each provider.

Returning providers: For Round 7 we continued to work with participating providers to improve their datasets. Check maps continue to be a useful tool to show providers how their area would be displayed on the resulting interactive state map and to get constructive feedback regarding corrections and changes that need to be made to their coverage and speed data. Generating these customized documents in each round is an extremely time consuming verification process, but it allows us to close many of the gaps that might have otherwise persisted.

Follow Up

After the release of the Round 7 survey in early January 2013,, LinkAMERICA launched an extensive effort to encourage responses. Every known provider was contacted at least twice during the months of January and February. The initial data submission deadline was set for mid-February, but we continued to accept "straggler" submissions into September.

No Response Policy

As mentioned above, every effort was made to contact each provider who appeared on our initial list. However, if no current information could be found on the company (i.e. no website, no valid phone number, and no contact person identified) they were removed from the list of "known providers". We believe the majority of those we were unable to reach were providers who have simply ceased to exist[2]. If we verify that a company is a broadband provider still doing business and are not able to get a response to our request for data, we make note of that in our datapackage.xls, and continue to reach out to encourage participation.

Summary

In summary, an intensive 45-60 day provider outreach and data collection process is initiated at the beginning of each round. In Round 7, given the data vintage of December 31, 2012, we began this process in December and the last submissions were accepted in March 2013.

While we continue to successfully engage the majority of providers in each round, the amount of manpower required to solicit complete and timely responses should not be underestimated. This process is one of the most costly and complex within the entire SBI program.

[2]The list of known providers and important submission statistics are contained in the datapackage.xls file.

Third Party Data Used

We have acquired the following commercial/restricted use data products:

- American Roamer, Coverage Right Advanced Services (tabular). This data served two purposes. The first was to verify the provider list and help find Broadband service providers not on other lists. The second was to verify the reasonableness of the Broadband service provider's submission.
- GeoResults Wirecenter Boundaries. This data was used in the verification of 'telephone' Broadband provider data. Where a public domain exchange boundary wasn't available, the boundary was used for coverage containment tests.
- Media Prints Cable boundaries. This data was used in the verification of Cable/HFC Broadband provider data. It was used to research valid providers and discover if that provider was offering Internet service.
- FCC 477 restricted use data were analyzed to find valid providers within a given area.
- Proprietary Provider Serving Areas. Since the first survey, a number of providers have supplied their engineering, serving area and/or franchise boundaries. We have maintained and enhanced these proprietary data sources.
- Towercoverag.com. This site offers a web mapping service to fixed wireless providers, many of which meet the criteria for our program. Providers can indicate through this site that they want to share their information for use on the NBM. In addition to using the site for provider validation purposes we pull mapping data for providers doing business in our state. In most instances we have found it necessary to contact the provider directly to get a complete and accurate submission of information for SBI.

We have included third party data sources which touch on each of the three major technologies analyzed within the SBI program. Each of these data sources tie back to a public domain data source, which provides a cross-verification mechanism for the commercial data product.

Although there are a large number of third party licensed data sources available, we remain conservative in our acquisition plans. From our limited analysis we are concerned about the ability to cross-verify additional third party licensed sources against public domain data. Further, we are unsure of how we may be able to integrate another data provider's view of valid Broadband providers within the definitions used by the NOFA (e.g. Are they using an FRN/DBA identity view or a marketing view? Can the provider supply in a 7-10 day window? Are they facilities based or not?). This leads us back to a statement we made in a 'lessons learned' Webinar (April 2010) about exploring a consortia to lower the cost of data acquisition and allow multiple entities to peer review the quality and methodologies behind licensed data products.[3]

Beyond these commercial data sources, we used a number of public domain sources. These included:

Geographic Data Files

[3] We also suggested forming a technical standards committee and a consistent system for confidence reporting.

- US Census TIGER data[4]

Sources that helped isolate providers, identity management or provider service areas

- NECA Tariff 4
- State produced exchange boundaries
- Carrier produced wirecenter boundaries (sometimes proprietary to provider)
- FCC Coals reports (321/325)
- FCC FRN API lookup tool
- FCC/FAA Antenna Registration System
- FCC FRN Lookup Tool (plain text search)
- USAC High Cost FCC Filing Appendices

Sources that helped isolate anchor institutions

- USAC Grant lookup tool
- USAC High-Cost FCC Filing Appendices
- HRSA data warehouse
- NCES data lookup
- State managed lists of schools (K-12), post-secondary institutions and libraries
- List of museums, conventions, and visitors bureaus from www.onlineatlas.us
- In state relationships to key stake holders.

Finally, challenges exist when dealing with the inevitable conflicts between provider-submitted data and third party sources (public or commercial). There is no guarantee third party sources are more accurate or timely than the providers' own reports. Indeed, some third party sources are based upon different standards than those specified in the NOFA, perhaps making them less reliable than information collected directly from providers. At the very minimum, provider data has a lineage and temporal status that we can identify. A concern we have with increasing use of third party data is that we have no way to verify its quality or development methodology. Particularly in rural areas we are concerned about what third party data may reflect based upon what we assume to be a small sample of information.

In other words, we may hit a wall in which we can't determine how the commercial source derived its coverage conclusion. To us this means that third party data sources are beneficial, but represent a supplementary view, not an authoritative one, of the NOFA defined Broadband market.

In short, we have chosen to use provider data as the baseline. We will challenge provider reports when third party data shows major anomalies, when submitted data conflict with prior submissions or when a consistent volume of consumer feedback points to a potential error.

[4] Census data were derived from < http://www.census.gov/cgi-bin/geo/shapefiles2010/main>, Census 2010 files. Roads were derived from the county faces and edges file downloaded at the same location and tiled for a full state.

Confidentiality and the Use of Licensed Materials

As a mapping vendor, we are reliant upon the cooperation of Broadband service providers. In large part, what underlies this cooperation is trust that we will not violate the proprietary and confidential nature of the data provided to us.

We are thankful for the confidentiality clarification that NTIA shared with us (included as Appendix 3). We use this as a guiding document to help us communicate with providers about what information NTIA considers to be confidential. Our suggestion is that NTIA publish this, or something comparable, to ensure a consistent interpretation of the NOFA and how it guides NDAs.

As some providers are non-responsive to requests for information, or lack resources necessary to put data into NTIA compliant formats, we have fallen back to the use of commercial data sources in several places.

For incumbent telephone providers we have used commercial wirecenter boundary products to filter Census Blocks and segments that are clearly out of their exchange areas. For cable providers we will use an estimate based upon Census Designated Places within MediaPrints named areas.

Public Engagement: Crowd Sourcing, Surveys and Social Media

Crowd sourcing (i.e., an intentional and carefully designed effort to tap into the collective intelligence of the public at large to expand our knowledge base) continues to be an important element of our data collection and validation process. An expanding use of social media is also an important strategy in our efforts to promote the programs overall and engage more citizens in the work at hand. To that end we offer various opportunities for the public to provide input via the online service coverage maps and the related 'Broadband story' process. These opportunities along with assorted public surveys have provided important information for the broadband effort in our state. As previously stated we see worth in engaging the public in this program and have found value in using social media outlets such as Facebook and Twitter to advance our process.

Consumer Surveys

Consumer surveys funded by the SBI grant have been hosted in our states over the course of this program. Many of which will be repeated over the remainder of the program by instate partners to establish and evaluate trends. The resulting data is helpful on a number of fronts in the SBI's mission to advance the access and adoption to Broadband. Survey data provides an important, albeit broad, gauge for assessing coverage information obtained by providers. For example, areas with widely available coverage (according to provider information), but lower consumer subscription levels (according to survey results), or perhaps where survey results suggest Broadband is not available, can be examined in more detail. Survey results are also very important to the broadband planning (and capacity building) components of the SBI program in that they help inform and formulate Broadband advancement priorities. Survey results also help inform Broadband policy discussions on both the local and state levels. Finally, survey results provide important information to the service provider community regarding market demand and Internet use in specific communities (i.e., regions).

Social Media

The phenomenon of social media is widely documented and is emerging as an effective access point for public engagement. We continue to explore appropriate ways to use a variety of social media venues in our SBI efforts. All of our efforts are informed by and consistent with relevant state statues and guidelines. Each state has a different perspectives on if and how the state will participate in the use of social media. Some state requirements are well defined and some are still being formed. Where appropriate, we use LinkedIn, Facebook and Twitter to support our work. A central focus is on promoting awareness of the program and seeking to expand engagement. In some situations we find that sub-program initiatives (e.g., regional planning teams) are making very effective use of Facebook to help inform and engage citizens impacted by the SBI program. In addition, we continue to evaluate how Facebook and Twitter can be used to drive public input on two important crowd sourced issues: online speed tests and input on map accuracy. Based on data obtained through our web site traffic monitoring process and readily available social media tracking processes, results are promising.

Capacity Building and Transitioning to State Partners

A fundamental goal of LinkAMERICA has always been to transfer knowledge and capacity to our in-State partners.

Within each State, transition planning and responsibility for specific activities is on a slightly different timeline. Much of this is driven by resource availability and partner identification within the State. For example we began transitioning the responsibility for Community Anchor Institution data to the State of Alabama in Round 3, starting with the use of interns to validate Community Anchor Institution data. In Round 4 the state's responsibility expanded to include collection of all CAI data, and in Round 5 the effort culminated with Alabama assuming responsibility for the CAI submission. LinkAMERICA supported this process with detailed transition documents and technical support. Alabama is continuing e the transition process assuming responsibility for the state website in the first Quarter of year 4 and is on track to assume hosting responsibility of the state map by Quarter 2.

In Idaho the SBI Framework Coordinator took on the responsibility of reaching out to CAIs in round 5. Since that time he has been working on a new outreach tool to enhance the data collection effort. Idaho, Wisconsin, and Wyoming are all working toward the goal of taking on responsibility for hosting the state map and website by the end of year 4. LinkAMERICA is providing support for this progression in each state with program leadership, technical assistance, tools, and project plans to ensure a smooth transition process.

Data Sharing With Other States

Where possible, LinkAMERICA works to share data with other state mapping entities. This data exchange tends to take two routes.

First for wireless providers if we find a fair amount of coverage that crossess into an adjacent state, we will ask the provider's permission to convey this information to the neighboring states. If the permission is received, we send the data to the mapping agency.

Second, in circumstances where we receive a speed that is outside of the technology speed 'norms' and this provider offers service in another state we try to check with other covered states to find out if the service is comparably marketed.

Trends in Submitted Data

Overall we note several important trends in this data submission. The list below represents general trends and not a scientific survey.

We note the following trends:

Activity from the FCC regarding the Connect America Fund has influenced the activity of providers and policy makers. In late December 2012 questions regarding coverage, partial coverage and updating to the round 6 maps took on much importance. This particular Public Notice generated a number of complex and ambiguous questions. We tried to assist users as best we could within the constraints of available time.

The coverage of advertised speeds is increasingly important. More and more providers are specifically concerned about where the submitted NTIA footprint shows available of 4 x 1 Mbps or 6 x 1 Mbps service.

Large national providers are beginning to submit block level speed information. In round 7 Windstream submitted block level coverage and speed. Other national Wireline providers, are more carefully reviewing the submitted coverage to ensure that it is consistent with their expectations.

xDSL speeds are increasing. More and more xDSL is likely ADSL 2+, VDSL, shortened loops, pair bonded or some combination of these. As we talk to providers who trigger speed/technology tripwires, we receive more and more feedback about the presence of these new technologies to enable speeds comparable with DOCSIS systems.

DOCSIS 3 is becoming the norm. Most cable systems are becoming DOCSIS 3.0. Over time we are seeing the DOCSIS 2.0 areas diminish. In some DOCSIS 3 areas there tend to be pockets of non DOCSIS 3 in predominant DOCSIS 3.0 markets.

There seems to be an increase in acquisitions among fixed wireless providers. Sorting out the acquisitions and territory abandonments has been complex and time consuming.

Fixed wireless providers are offering broadband services approaching 1 Gbps. This is occurring both in terms of licensed and unlicensed spectrum. Part of this is driven by where a provider has fiber or high capacity wireless backhaul but we are receiving more and more information from providers and radio manufacturers specific to very high speed wireless services. Although the service can be deployed

within the 7-10 day NOFA window, these higher speed services tend to be purchased by high capacity customers. It may be worth reconsidering the speed norms in this category as well as adding a field in the data table to indicate when a speed value is geared toward a specific end-user class.

There is less and less of a distinction between fixed wireless and mobile wireless. As firms market LTE and/or WiMax as home DSL alternatives we are a bit unsure how these two classes are to be established-what is the operating distinction between Transtech 80 (mobile licensed) and Transtech 71 (fixed licensed) when both are used as in-home Broadband service?

Satellite providers are advertising broadband services comparable in speed to xDSL. Some satellite spectrum codes are not available for use in the data model. Some satellite providers are beginning to indicate a difference in speed within the states. We are working with providers to clarify this new type of submission.

We continue to see a number of national Broadband providers who do not show broadband coverage within pockets of otherwise covered areas. In the figure below, the orange represents Census blocks which are NOFA broadband covered. The transparent areas have no NOFA broadband coverage from the same provider.

Figure 1--Uncovered pockets within urban, covered areas

This coverage drop-out appears to be happening in urban Census blocks typically with schools, shopping malls, universities and large businesses. We don't know why this is happening, but it could be an impact of the NOFA restriction on 7-10 provisioning. This is a noticeable artifact in the data and does challenge the notion of some who see NOFA compliant Broadband coverage as a uniform surface across an area.

We see a pattern of some providers clipping their coverage to reflect what we believe are license boundaries. Although the coverage clips have been apparent in the past, they appear more abrupt in this round.

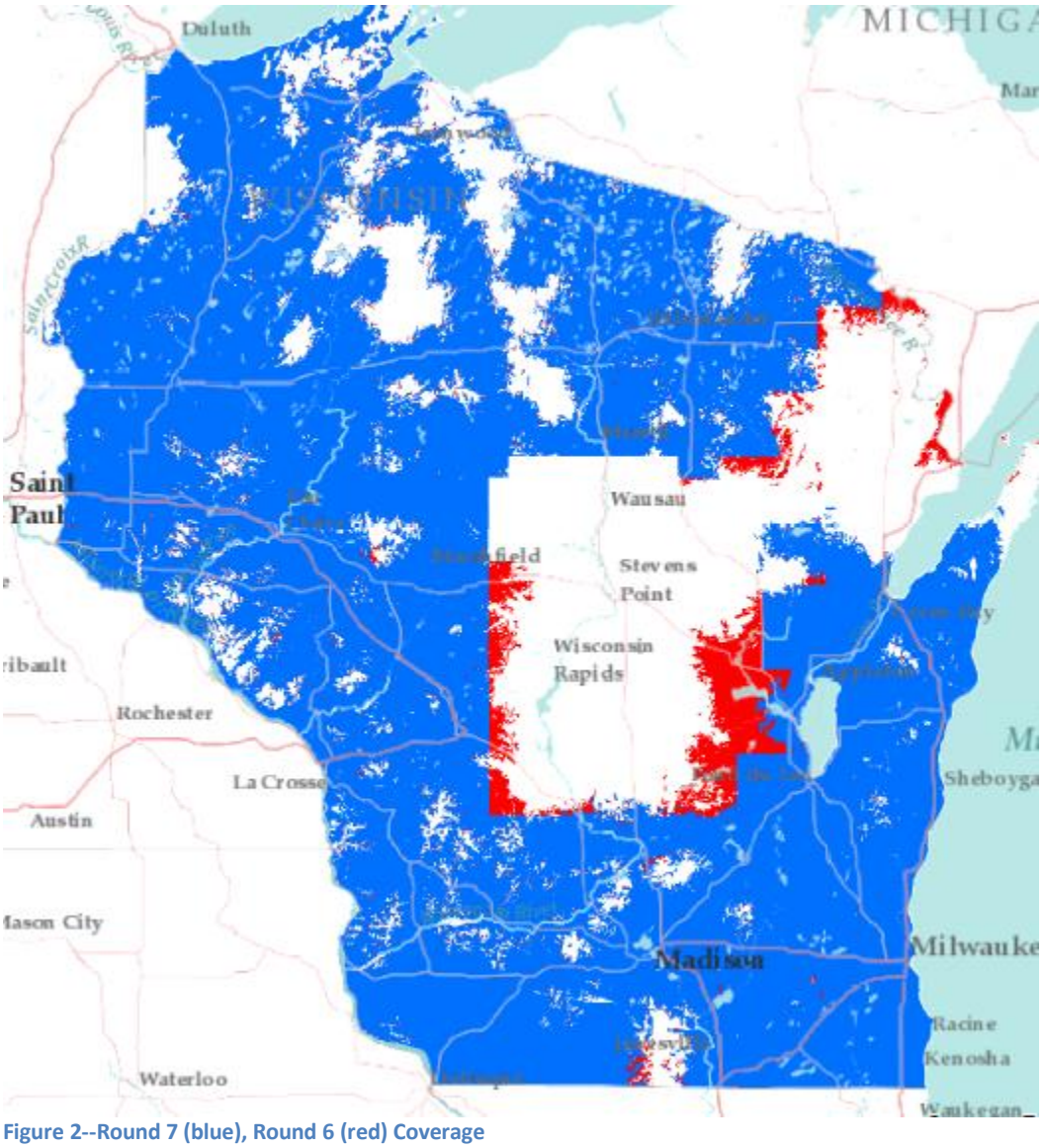


Figure 2--Round 7 (blue), Round 6 (red) Coverage

Data Production Process

To support our objective of transitioning the data development process to our State partners, we continue to model, refine and document our data production process. We find this to be a very beneficial step for two purposes.

First, it helps us understand why (and if) a task is being done, and if it is being done efficiently. Much of this program started so quickly that it was difficult to plan logical integration and hand off points among the various workgroups. Further, we are currently in the process of consolidating much of the process data (check-ins, check-outs, metadata) and we can use this process model to efficiently plan cohesive information architecture.

Second, our process documentation and modeling helps explain why resources are being consumed in a particular way. This helps our State partners plan for in-sourcing specific tasks as their time and budgetary constraints allow. It also helps our LinkAMERICA team better plan and cross-train members to deal with the work surge that occurs 30-45 days prior to submission.

Finally, documenting and modeling our process helps us to take advantage of increasing specialization and proficiency with certain types of data and management responsibilities. In submission 3, we had identified data "czars" responsible for check-in and check-out of data. That data czar helped to bridge the gap among receipt functions, provider feedback, production and DBA. In round 5 the data czar was also tasked with alerting on speed/technology tripwires. This individual was responsible for taking the initial review of each submission and determining if an NTIA speed/technology warning would be triggered.

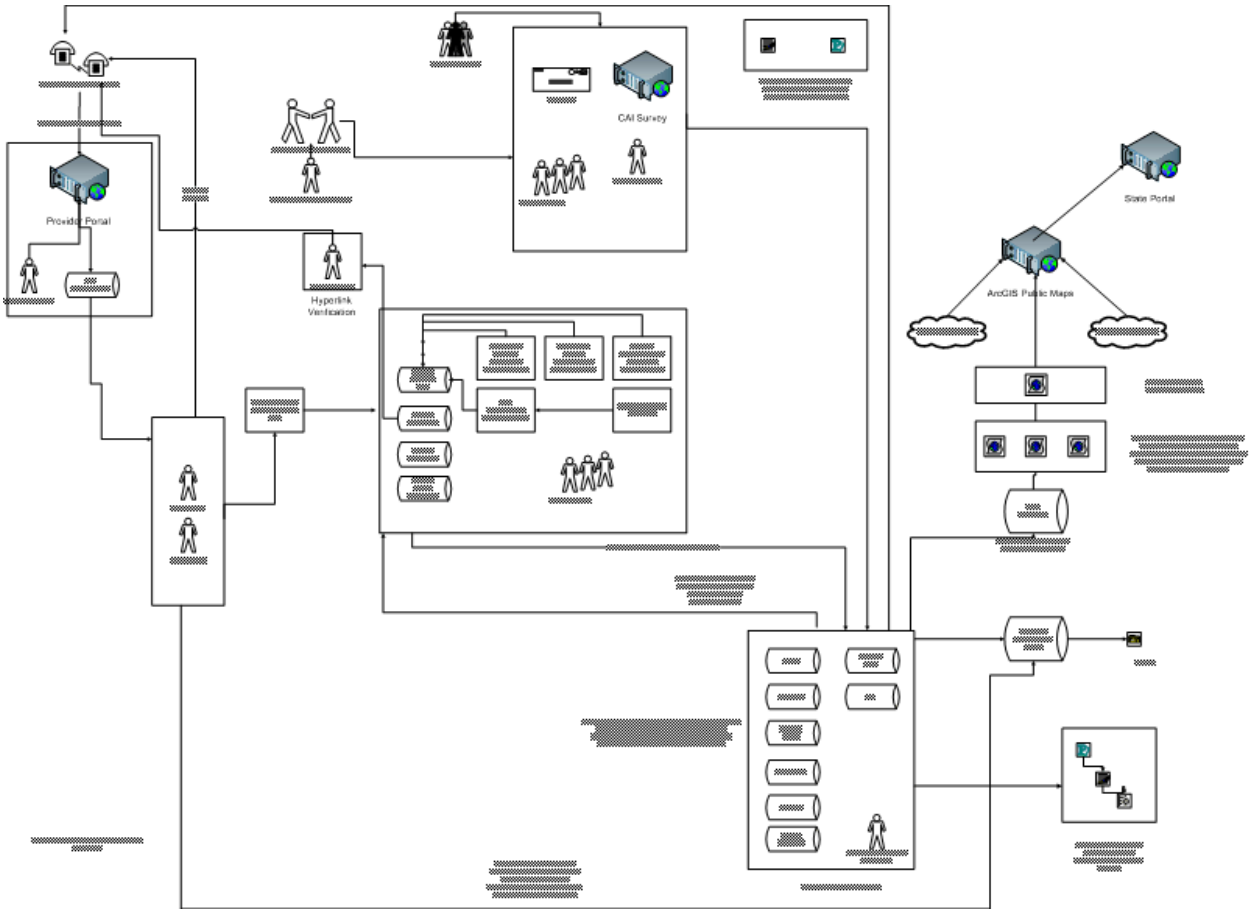


Figure 3—SBI Data Development Business Process Diagram

Provider Tracking In the Cloud

Prior to initiating the Round 5 survey, LinkAMERICA transitioned in house provider tracking systems to a Cloud based application, TrackVia.

The movement away from desktop solutions was based upon several factors. First, the architecture these systems were designed under no longer met the program realities. For example, deliverables like Datapackage.xls were not contemplated when the original provider tracking system was developed. Second, the ability to share data across multiple geographic areas and organizations was becoming increasingly important as the program evolves and responsibility moves to in-State partners. Third, portions of this data need to securely transition back to State resources who may or may not be able to support a specific IT infrastructure. These factors combined to make the Cloud applications a valuable alternative.

As with any IT transition, the process has not been without challenges. Nonetheless the investment in time and resources has proven to be effective and worthwhile. We anticipate further movement away from desktop oriented architecture to a more open, Cloud type solution.

Data Production Methods

As raw data were received from the provider community, attention turned to normalizing the disparate submission formats[5]. The team considered each submission with respect to the following criteria. These criteria are important because they perform the basis for our verification and quality assurance process. In other words, we have to appropriately scale our data verification efforts to match the scale or ambiguity of the following:

- Locational certainty
- Speed certainty
- Temporal certainty
- Provider and network ownership certainty

The team's goal was NOT to quantify a particular degree of precision with respect to any of these criteria. Rather, we are working to attribute the above "certainty attributes" to each submission, and will continue to implement quality assurance and verification mechanisms that are resource-appropriate for each.

Deriving Broadband Coverage Information

Broadband Coverage[6] was normalized into four formats:

1. Coverage in Census Blocks (2010) of 2.00 or less square miles
2. Covered Street Segments (2010) in Census Blocks greater than 2 square miles[7]
3. Address Level Coverage (point data)
4. Wireless Service Areas (SHP file format)

With each submission, the team went through a series of steps to normalize and categorize the data. Since data arrived in many different formats, and at many levels of granularity, the following normalization procedures were used:

- Determining the nature of service being provisioned (who is providing service and what technologies are in use)
- Planning an attack strategy for the submission –understanding the data and assigning team members to various tasks
- Alert provider relations staff if the received data trigger an NTIA speed/coverage tripwire.
- Georeferencing the data; QA the georeferenced data
- Geoprocessing the geo-referenced response

[5] In line with NTIA Best Practices we continue to request and receive a large number of data input formats. This ranges from tabular block lists to hand drawn maps.

[6] Speed, Anchor institutions and Middle Mile facilities are discussed in later sections.

[7] To help clarify issues relating to Census block area and vintages in use, our team published a technical paper to the Grantee workspace. Because we were unsure if this standard should be implemented uniformly, this document was never distributed to the provider community.

- Segregating the submission into the correct NOFA-compliant submission formats.
- Apply appropriate source metadata[8]

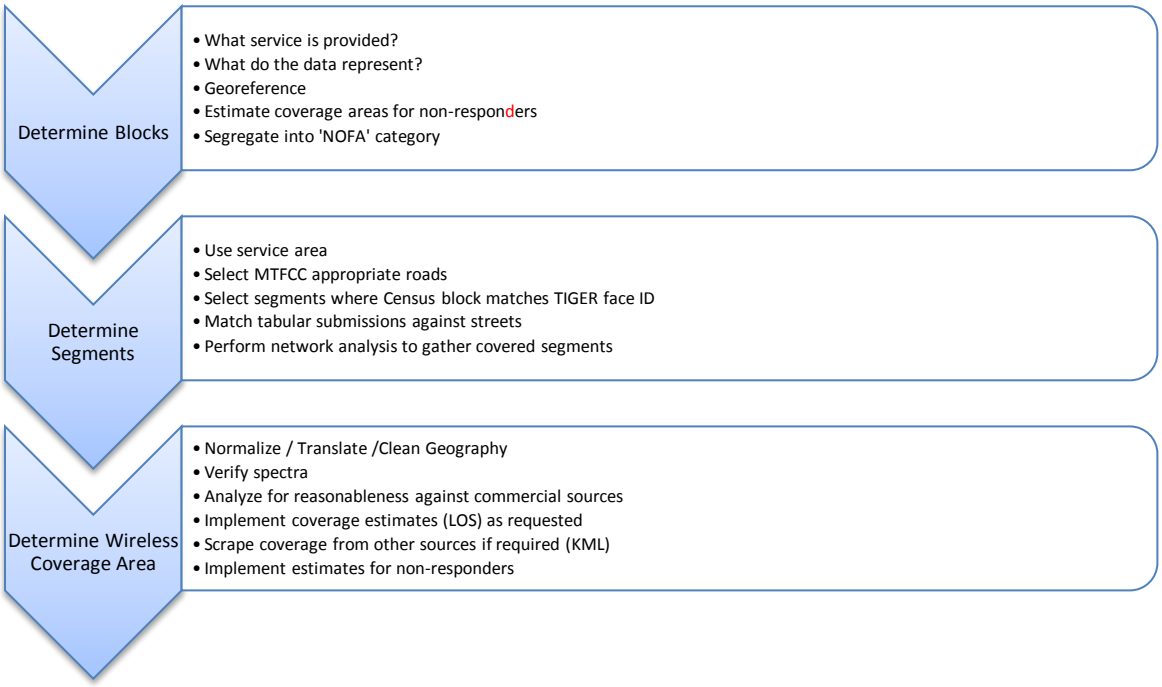


Figure 4-Components of Broadband Coverage Process

Impact of Program Change

There were several important program changes that impacted how Broadband coverage was developed and submitted to NTIA in Round 7.

Speed Examination

Given recent concerns about the depiction of speed and what that mapped speed represents, LinkAMERICA invests considerable time requesting detailed information on speed which appeared to be beyond normal speeds for a given Technology of Transmission given the NTIA supplied frequency tables.

Based upon these conversations we learned

A) For incumbent telephone providers; the speeds beyond the normal xDSL range represent significantly shortened copper loops, as well as upgrading DSLAMs and modems to support ADSL2+ or VDSL.

B) For cable providers the intermixing of DOCSIS 3.0 and non 3.0 systems in a market area is typical and sometimes reflects a circumstance where segments of plant cannot be upgraded to DOCSIS 3.0. This variance can be at a level below the Census block. In these cases the maximum advertised speeds

[8] When our team logs a submission into the staging database we record at least two attributes. One records the method used to derive the coverage, the other records the method by which speed was attributed to that object. Other attributes carried to NTIA carry source meta values as well.

remain to represent the market area but the plant variance is typical. We also have one 'cable' provider who is delivering DOCSIS 2.0 over fiber plant (RF over Glass or RFog).

C)There exists a fundamental disconnect between some providers reporting a service qualified speed--the maximum speed available at a structure versus other providers submitting their maximum speed at the market (MSA/RSA level). Both submission paths are available to providers but the likelihood of providing a speed incompatible with a technology is much greater for providers submitting market level speed. For the most part, wireline providers are submitting block level speeds. This creates a fundamental disparity between the wireless speed reporting between wireless and wireline providers.

D)Fixed wireless provides are using new radio technology to quickly deploy services which rival and sometimes exceed those of wireline service providers. These speeds are being advertised, sometimes on public facing websites as well as using direct field sales staff to target specific high demand customers. These services are actively marketed but they challenge the data model in that the speed is marketed and available within 7-10 days of request but the nature of the fixed wireless submission forces attribution of this speed within a potentially large geographic area.

E) There exists a minority of providers who submit a theoretical speed that is unmatched by their web advertising. In these cases we request clarification from the provider on the inconsistency. Our experience has been that providers will modify the speed to be consistent with their marketing and advertising.

F) The maximum advertised speed offered is not always clear. Sometimes the speed is described in advertisements in terms of a combination of video and data. Other times it is data not video. Some providers allow a customer to select how much bandwidth they want to allocate to their data stream versus video stream. In other words the bandwidth available to a household is constant but how it gets allocated among the data versus video becomes a customer or service directed choice. This makes getting Maximum Advertised Downstream speed very difficult because it is not just a product of the broadband network which we are mapping but also the customer's selected service package. Upstream is rarely advertised. Different marketing channels (Business to Consumer versus Business to Business may yield different marketed speed combinations.

Provider Definitions

Within our provider verification process we work to derive a state level provider match against third party data sources. As discussed in the early pages of this manual, there is no guarantee that a third party data source is any more accurate than submitted data, nor does it necessarily reflect the provider ecosystem specified in the NOFA, Technical Appendix A. We devote significant resources to matching our submitted data against outside data sources. In many cases this becomes a judgment call trying to match provider names across systems. It is a difficult and somewhat arbitrary process. Nonetheless we

do believe it has value because it forces a re-examination of who we believe is an appropriate provider within a non-NOFA context[9].

The use of a provider match system, as well as the webinar comments (3/17/11)[10] directing grantees to estimate, wherever possible, non-participating providers have made us back away from one of our fundamental assumptions in data collection. As discussed in prior versions of this manual, we had developed a certain "hold-out" class of data when a provider's data wasn't of sufficient quality to verify, or we were unable to put it into the data model (e.g. address points submitted for fixed wireless). In submission four, much of this hold-out data was included[11]. In some cases this involved using simple polygons to capture a wireless ISPs serving area. Other times, if we are confident in the coverage, but can get little clarification on the submitted speeds or frequencies, we release the coverage and note in our internal metadata the source issues with the other attributes.

In the weeks leading to submission 5 we received a request from NTIA to clarify the presence of unusual shaped wireless polygons. Our interpretation of this was a request for information relating to the source of these data which do not appear as propagated coverage. Although the 'unusual shapes request' represents a very small portion of the submitted data, it begs an important question about the expectations with respect to wireless coverage patterns. We look forward to working with NTIA to address these issues in a fair way across States and providers. We would not want to create a coverage dichotomy where advertised coverage was disallowed from the NTIA submission because of an expectation about how advertised coverage should appear. One concern we have when we develop a coverage estimate which differs from a providers advertised coverage pattern, which should we submit? As of the current round, this remains an open question.

Finally, we use the provider type classification of 'other' to bring specific aspects of certain provider's data into our submission. There still seems to be confusion on how to handle provider types where a provider offers multiple paths to provision Broadband for typically business customers. Rather than waiting for certainty on the answer, we bring the provider in and list them as provider Type "other". Our sense is provider Type "other" will continue to expand in subsequent submissions.

Clearly one challenge is the data, but an equally significant challenge is appropriate messaging around this "other" provider type category. We do not want to leave consumers with the impression that they can get a high capacity fiber or microwave link despite the fact that the hospital next to them or in a nearby Census block can get this service.

[9] We have requested from NTIA information on how provider matching is done within their QA process; beyond the relatively short whitepaper posted with the national map <http://www.broadbandmap.gov/blog/wp-content/uploads/2011/02/DataComparison_Methodology2.pdf>, we have not received any more detailed information on how providers are cross verified between submitted and third party sources at the national level. Our understanding is licensing concerns are holding the release of this information.

[10] Clarifying comments from Akins Lawl indicate the Program Office does not want Satellite providers estimated if the provider is non-responsive to data requests (email 9/12/12).

[11] We continue to process older submission data looking for information and methods by which we can estimate coverage information. This will be an ongoing process.

After the April 2011 Grantee conference, LinkAMERICA submitted a paper describing our provider classification system[12]. It is our feeling that understanding the type of provider is essential to appropriate verification methods.

Coverage Geoprocessing Methods

The next section discusses how data were georeferenced and geoprocessed given a particular submission format. We have yet to find a particular method that works across all submissions. Rather we tend to tailor our geoprocessing to meet the specifics of the service provider and data submitted.

In most cases, in Round 7 we were not provided with street segment geographic objects for Blocks greater than two square miles (large Blocks). This necessitated subsidiary geoprocessing. As stated before, our first goal was to derive block level coverage. Then, for Blocks greater than 2.00 square miles, we moved to a segment gathering processing. The segment process will be described in the last section.[13]

Block Level Coverage Derivation Using Service Point Data

A number of providers submitted point level customer data.

In some cases the submissions themselves were not internally consistent. For example, in the image below, unprojected points are shown, while the Census block polygon to which the points are supposed to "belong" is highlighted. In this case, one of the following scenarios has occurred: block attribution is wrong, the points are not in the location to which they are attributed, or different block shapes were used than what is assumed.

[12] https://sbdd-granteeworkspace.pbworks.com/w/file/42309493/provider%20ClassificationFINAL.docx

[13] As has been discussed previously, we note inconsistency in how providers are supplying information at the block and segment level. Beyond the temporal differences, we see that providers are computing area differently, as well as including or excluding water areas. This provides an inconsistent measure across providers for the 2.00 sq mile cut off. Our preference would be to provide guidance to service providers within our states, but our concern is that we will inconsistently message this with grantees in other states. We would appreciate consistent guidance from FCC/NTIA on this topic.

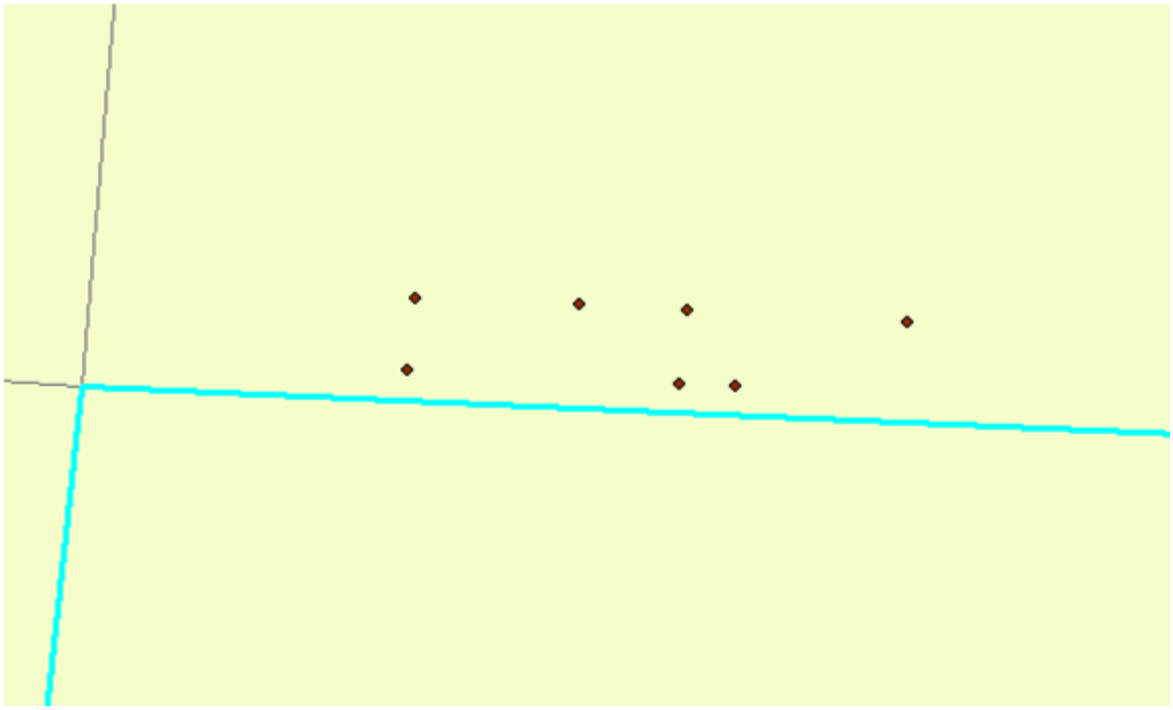


Figure 5-Internal inconsistency in submitted data

In other circumstances, we found that inconsistent geocoding standards may produce misleading results. The next image shows point level data, and the Blocks are colored based upon the counts of points intersecting Blocks. The challenge this presents is that if geocoding was performed on a different dataset than the block boundaries (the road traces are not coincident with block boundaries) and/or geocoding was done without an offset, it becomes problematic to assign coverage to a Census block based upon only the point locations.

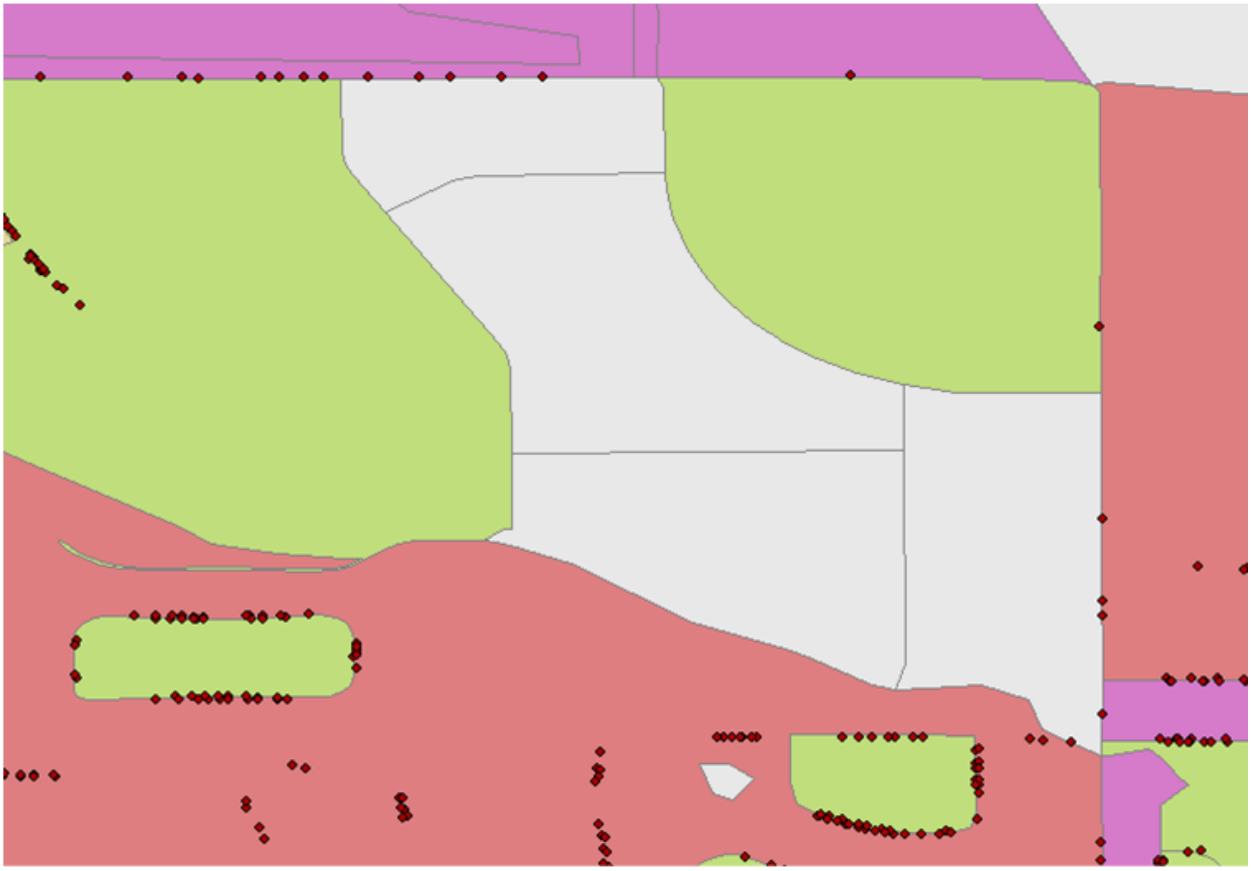


Figure 6-Block Coverage

For this reason, where we were provided address point data and asked to generate covered Census blocks, we elected to use a 200-foot buffer to select Census Blocks that intersect our points.

We also see a number of providers submit customer data and facility data. Their intent is to allow us to have two primary sources from which to derive the most accurate coverage. In these cases we tend to look for clusters of customers in areas where we see no facility based coverage.

With respect to deriving Block level speed from sub-Block data, we have instituted a business rule where the predominant speed in a Block is the speed we attribute to the Block.

Block Level Coverage Derivation Using Customer Facing Plant Level Point Data

In other circumstances, providers submitted point level plant data. From what we could gather, these points tended to be customer-dedicated terminals. Typically, these providers were high speed Broadband producers—which may somewhat strain the definition of Broadband as other providers supplying comparable services specifically disclaimed the ability to provide high-capacity Broadband services in the required 7-10 day interval. In these plant point data submissions, we had similar concerns to the point level customer data, but two factors tended to make us use a more conservative intersection buffer. First, we tended to have far fewer points to work from, so our concern was grabbing too many covered Blocks as the Blocks tended to be much smaller in these urban areas.

Second, these plant points tended to be dedicated to distinct customers, but it was difficult to know which element of the customer's campus to attach coverage to.

In the case of the image below, given a small shift to the left, it would be easily possible to gather 1 to 3 Census Blocks from this point. Although orthoimagery is helpful in a circumstance such as this, it is still indeterminate.

Thus, in the circumstance of plant level point data, we used a 100-foot intersection buffer.

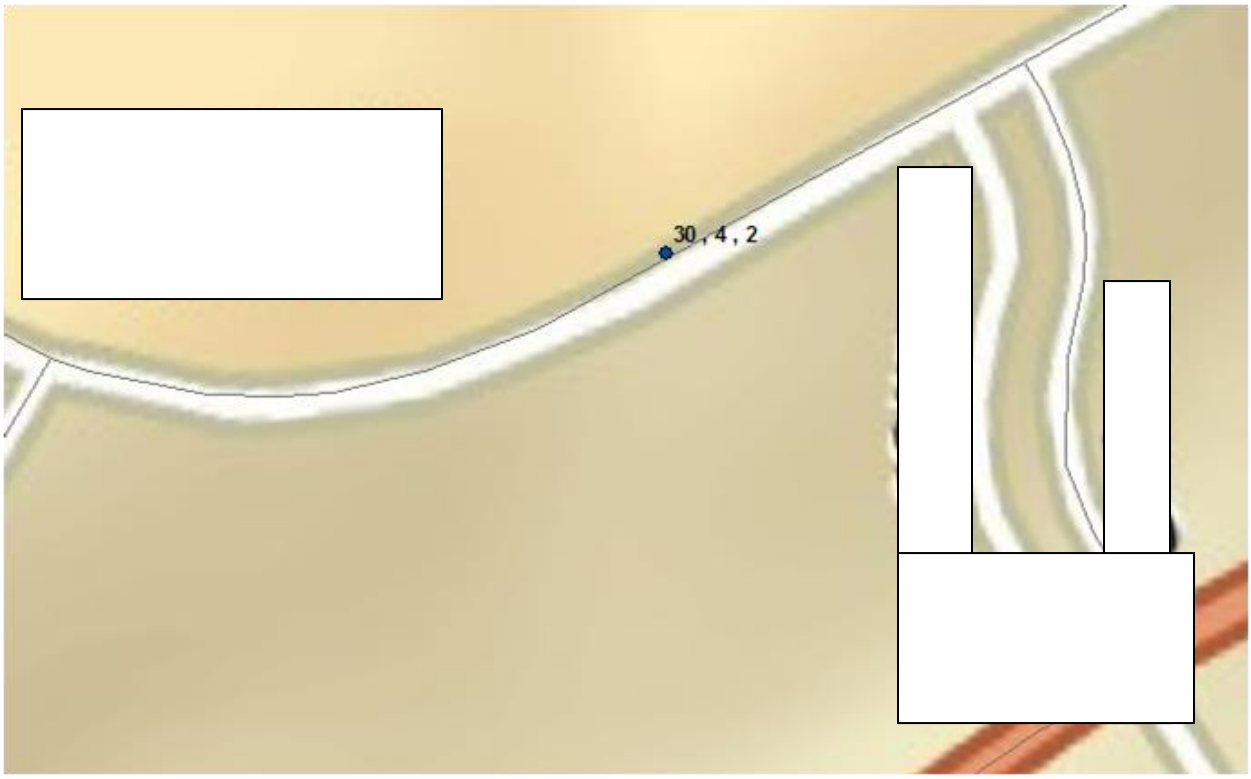


Figure 7-Plant Point level data

Coverage Derivation Using Linear Facilities Data

A number of providers submitted facilities data. We handled this data in different ways depending upon what we believed the facility data represented.

Most telecommunications networks are divided into two components. Feeder - supplies higher capacity nodes (eg. DSLAMs, Fiber Nodes). Distribution - usually supplies customer premises (NIDs, Pedestals, Taps, ONTs). Where we could discern what facilities we were provided, we used different methods.

The next image demonstrates a geo-referenced CAD image as given to us by a service provider. Note the light and dark green shading. We would infer that the lighter segments represent distribution and the dark green represents the feeder network.

In the case of a combined strand map, we used a relatively tight buffer of 200 feet to gather covered Census Blocks. Our intersection tolerance is based upon an assumption that our data likely represent a

situation comparable to customer point level submission in that we have most of the network footprint captured.

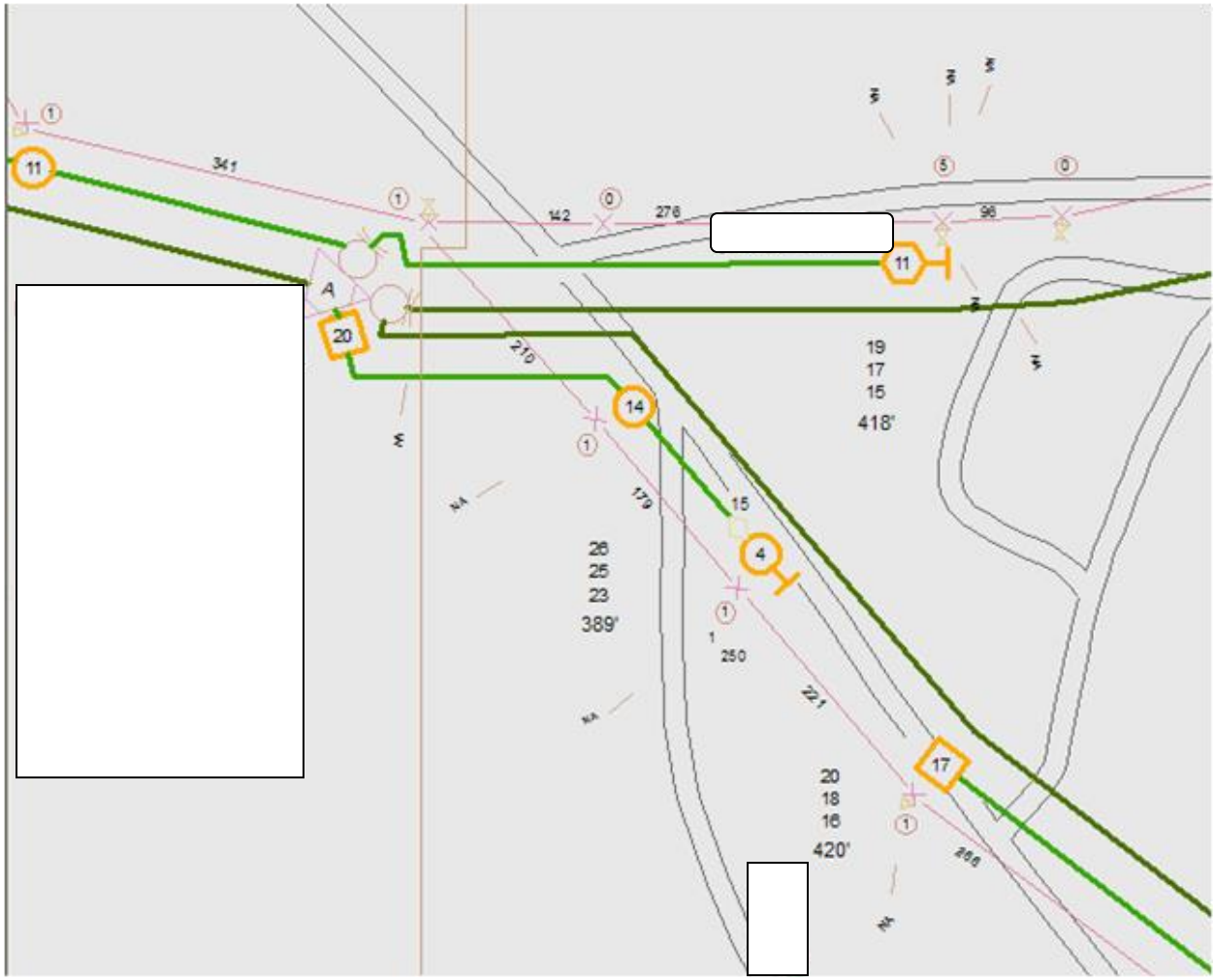


Figure 8-Georeferenced CAD information supplied by Broadband provider

In other circumstances, we were provided engineering information that we inferred to be feeder only. This inference was typically based upon the presence of fiber optic equipment only. In these cases, we used a more generous 2,000 meter Census block intersection. The 2,000 meter criteria was based upon an informal survey of population in proximity to the geo-referenced strand data, but it could be varied based upon a more complete survey.

Coverage Derivation Using Covered Street Segment Data

In some cases we were provided with covered street segment data. Covered segments tended to come from two sources.

In some circumstances, providers gave us CAD data, which was not drawn in a projected manner. This is relatively common for older engineering data derived from hand drawn records. This meant that our

team geo-registered the image into an approximate position. In this case, the boundary streets were selected, and an enclosing polygon was derived. The intersection of this polygon and the Blocks within became the geoprocessing method to derive Blocks.

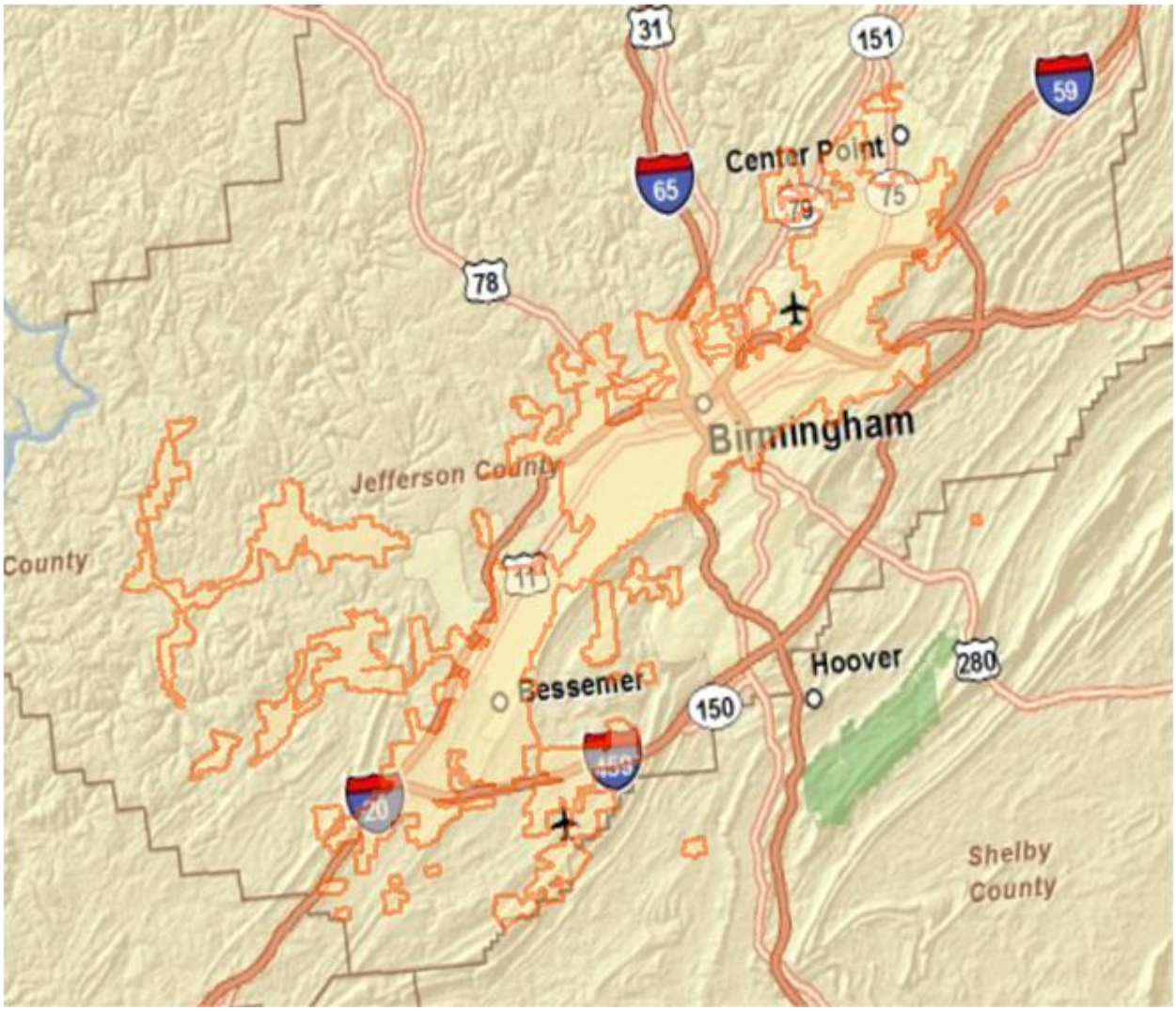


Figure 9-Coverage derived from street segments

In a second circumstance, street segment data was developed during coverage estimation. Handling the estimated data is discussed below.

Coverage Derivation Using Serving Area Point Submission Data

In other cases we worked with providers to derive service areas based upon point plant data. In these cases we were given a serving node and an appropriate road length service boundary. There is an important distinction from the plant data discussed above. In this specific case, the data submitted was a node that served many locations--such as a Central Office or DSLAM. This is contrasted with the earlier example in which the point represents a node serving only a few customers.

When trying to derive coverage from Central Office or DSLAM nodes, the team used ESRI Network Analyst to derive covered road segments honoring these road engineering parameters.

The figure below shows street level coverage derived from Central Office and remote DSLAM point data.

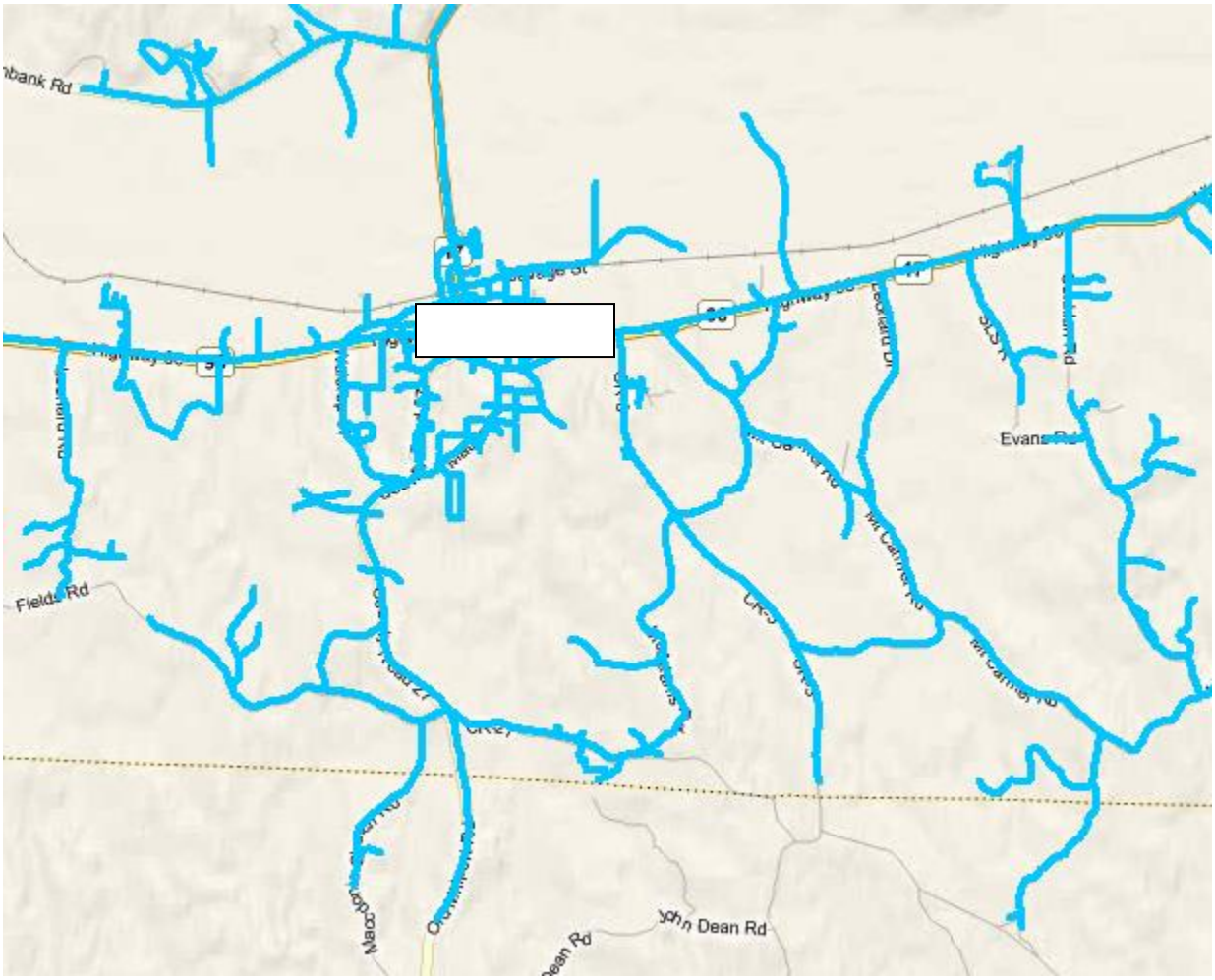


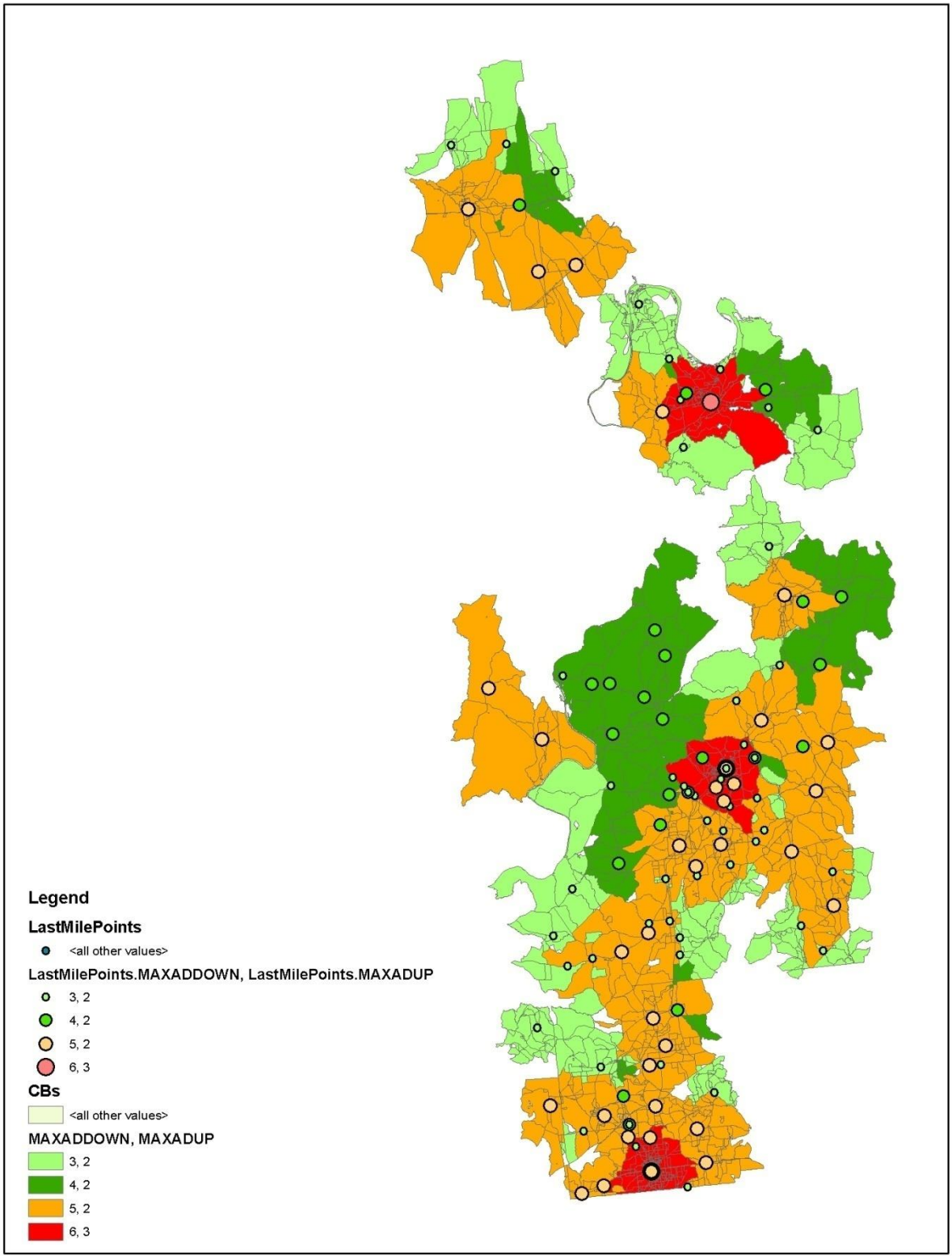
Figure 10-Coverage derived through road paths

In response to Provider feedback we revised this process to include a larger variety of TIGER road types. In Round 1, unimproved roads were not used. In the current submission -- particularly to improve estimates in areas bordering parks and public lands -- a wider class of TIGER roads was used.[14] We still get concerns from service providers about missing road segments and incorrect centerline appearance.

The segment level coverage is easily extendable to derivations of Census block level speed. The figure below shows the attributions of block level speed based upon the Maximum Advertised Speed available from a DSLAM. Although the methodology isn't perfect, it does provide insight into the value of granular infrastructure data.

[14]Only TIGER features of MTFCC type S1100 and S1200 were excluded from use.

Over time we have seen an increase in the number of providers submitting this type of data for our use. Our sense is some providers find plant level data easier to generate and are satisfied with the results of derived coverage.


Legend
LastMilePoints
<all other values>
LastMilePoints.MAXADDOWN, LastMilePoints.MAXADUP
3, 2
4, 2
5, 2
6, 3
CBs
<all other values>
MAXADDOWN, MAXADUP
3, 2
4, 2
5, 2
6, 3

Coverage Derivation Using Polygon/Polyline Serving Areas

Broadband service providers sometimes submitted coverage in terms of served areas. This was either in direct geospatial formats, CAD files, or paper maps. The image below reflects a carrier's service area. Within that service area, there are variations in technology of transmission and served speeds. When polygons with speed data and technology of transmission were available, we used a spatial intersection to gather covered Census Blocks. In many cases, using covered Census Blocks resulted in a loss of the speed variation (sometimes the speed variation was at a level smaller than a Block and did not get picked up within a spatial query).

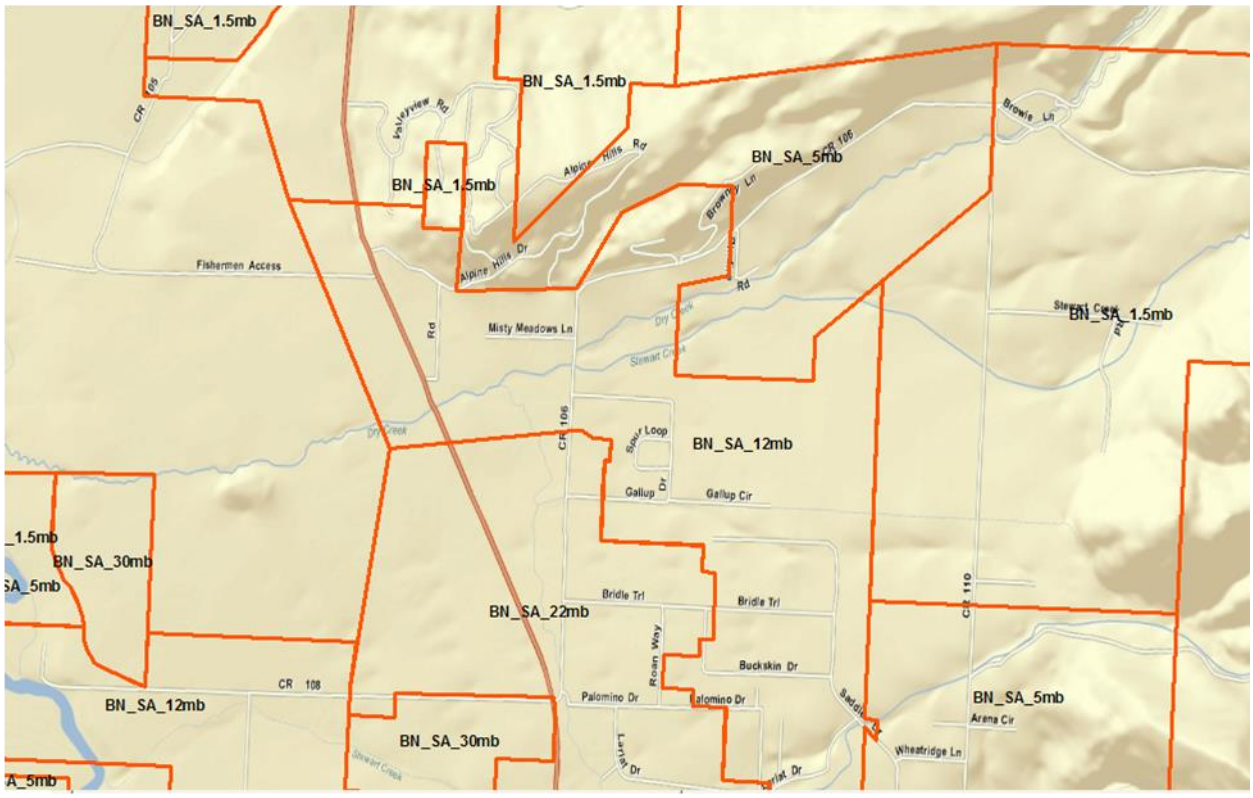


Figure 11-Coverage derived through serving area polygons

Although we cannot directly solve the loss of speed granularity due to Block shapes, we honor a business rule wherein we always select Blocks from the highest speed areas first, and then allow the lower speeds to select from the remaining Blocks. This is an arbitrary rule, but our feeling was that it should be a consistent selection, rather than an unordered selection.

Street Segment Derivation, Large Blocks

For those calculated Blocks greater than 2.00 square miles (large Blocks), we provided coverage in terms of covered street segments and corresponding geography.

With respect to segments we had four sources of data:

1. Covered large Blocks
2. Tabular street segments and address ranges for large Blocks

3. Geographic segments either with street attributes or without
4. Service area boundaries

A few providers only provided a list of covered large Blocks without corresponding segment information beneath the block. This provided the choice of either selecting all segments in the block, or none. Because we had little information from which to make the selection, we elected to be conservative and did NOT pass any covered segments to NTIA from this submission format.

Some Broadband providers submitted covered street names and street ranges. In these cases we performed a manual analysis trying to link to specific segment names and address ranges within covered Blocks. Sometimes this was a simple process because a provider used a TIGER derived street database. In other cases we could not determine the source of the provider's street data. Street and Address matching tended to yield a relatively good result (typically between 30% and 100% of possible segments in the Block), but was very time consuming. Where yield rates were low, our result was a shredded

segment coverage pattern, like the image shown below.[15]

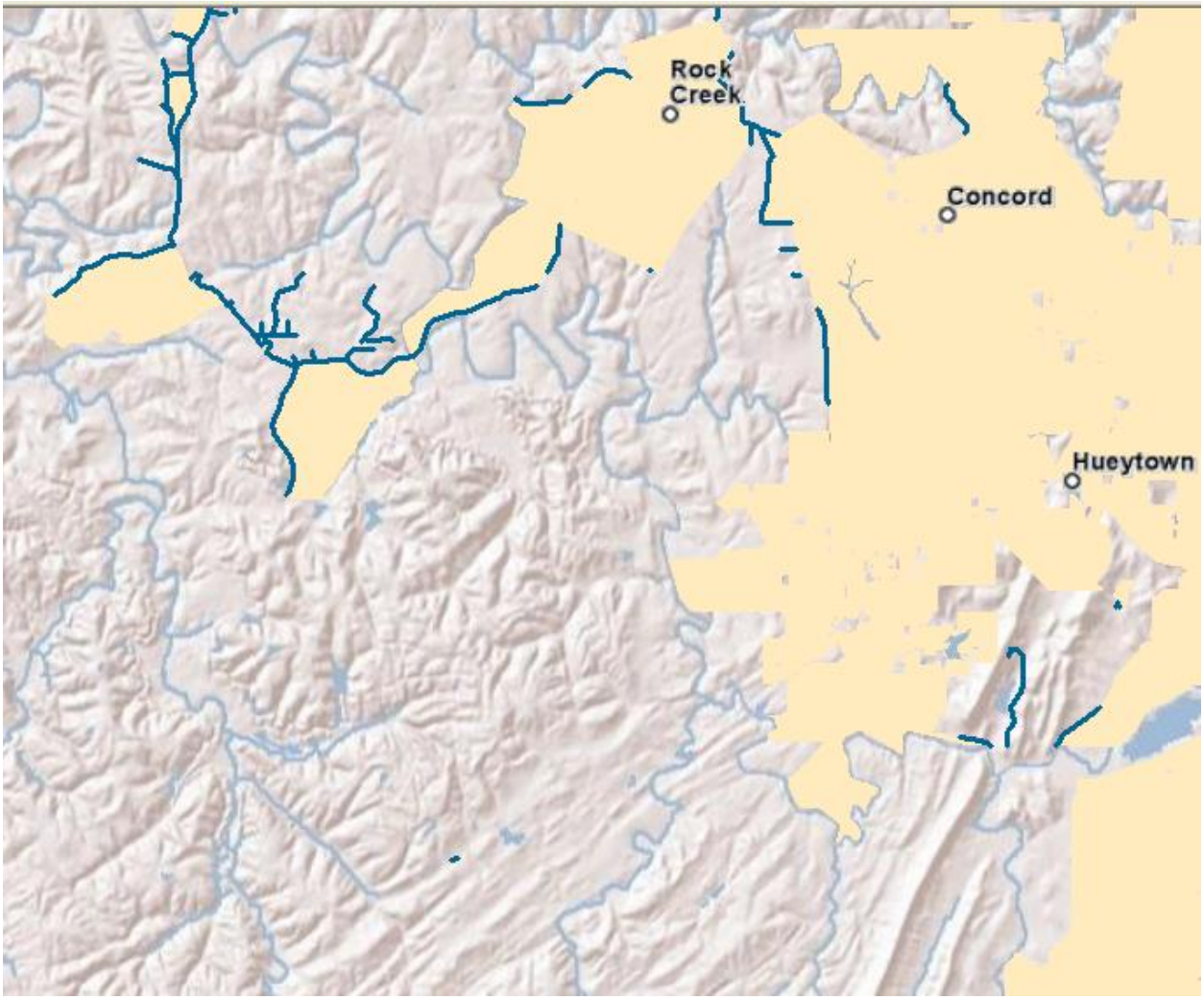


Figure 12-Blue road segments adjacent to peach covered small Blocks

A number of providers submitted geographic objects. In this case, our manual process was directed toward a conflation of data sources. The goal was to take provider submitted segments and put these segments in terms of our TIGER 2010 basemap. Although there is a trade-off in the accuracy using non-provider submitted segments, we felt it was more important to have a license-free road set that would edgematch our Block features, the TIGER state boundary and remain consistent with the block size standards we used for other providers. This is important for the appearance of the online maps, as well as potential verification work where we are attempting to judge a feature based upon its attachment to a covered small Census block. The figure below shows street segment input data.

[15] We continue to hear providers expressing concern that our request for either a geographic object or TIGER Line ID is beyond the scope of the NOFA clarification. Therefore, they cannot supply additional information to us.

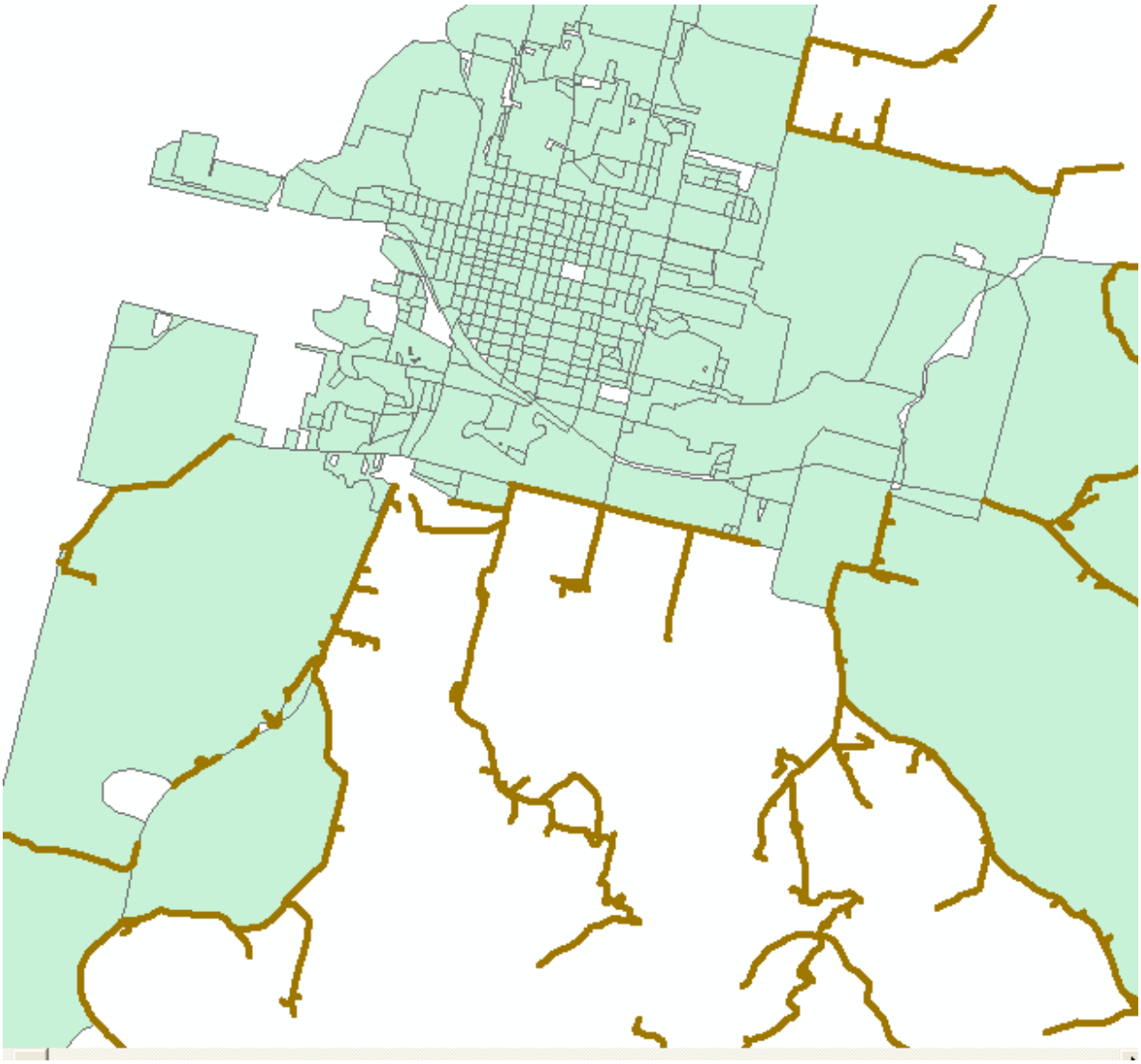


Figure 13-provider Submitted Street Segment Objects. The segments don't edge match the Blocks nor are they continuous.

The figure following demonstrates the same area after the conflation process. Blue segments are the conflated TIGER roads which will be passed to NTIA.

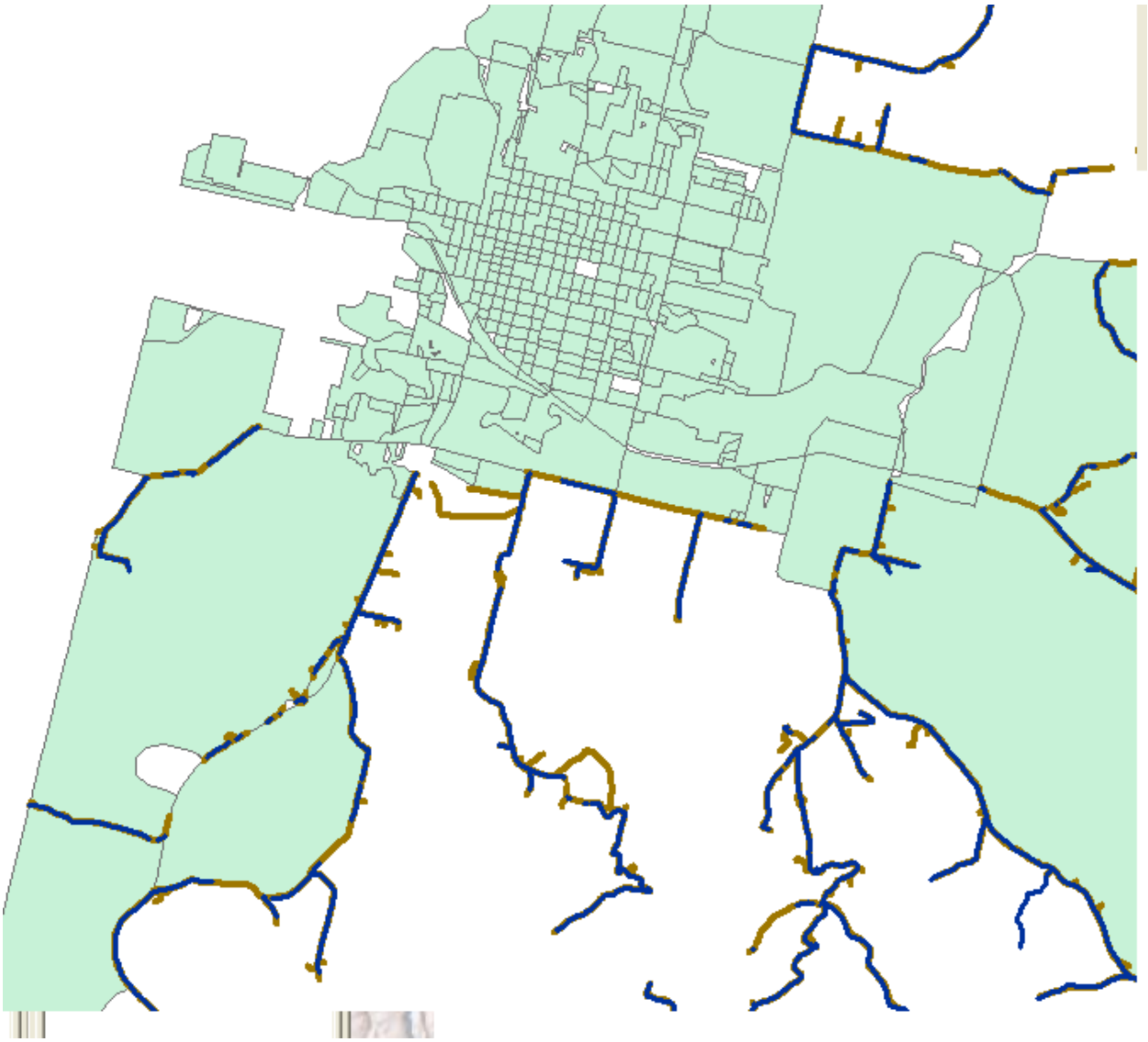


Figure 14-provider submitted segments in gold, selected TIGER in blue—Conflation result; in many cases what was a continuous segment is made discontinuous because even with a distance buffer the TIGER segment doesn't always intersect the provider segment

The final segment process was used when we were supplied with a Broadband covered area polygon. In this case, we found the segments within covered areas and eliminated those segments inside of Blocks less than or equal to 2.00 square miles.

Because there was more control over the format of the inputs (we knew we had a boundary and were working with TIGER segments), this was an automated process that followed this general format:

- Select large covered Blocks by provider ID (from updated Large Block table)
- Select TIGER 2010 road segments (MTFCC like 'S%') that face (CB = CBLeft2010 or CB = CBRight2010) covered large Blocks for provider

- Select segments as distinct records, max speed with corresponding technology, join in feature names, export selected records to temporary DBMS table
- Join TIGER roads feature class to temporary table on TLID
- Select covered segments (Python script)
- Select service area polygons for provider
- Clip selected facing segments with selected service area
- Export clipped segments to staging feature class, keyed by providerID

In this figure, orange represents covered small Blocks; black lines are covered segments in large Census Blocks (light blue). The service area boundary is shown in grey. Based upon feedback from providers, we have elected to clip segments at the end of a coverage boundary.[16]

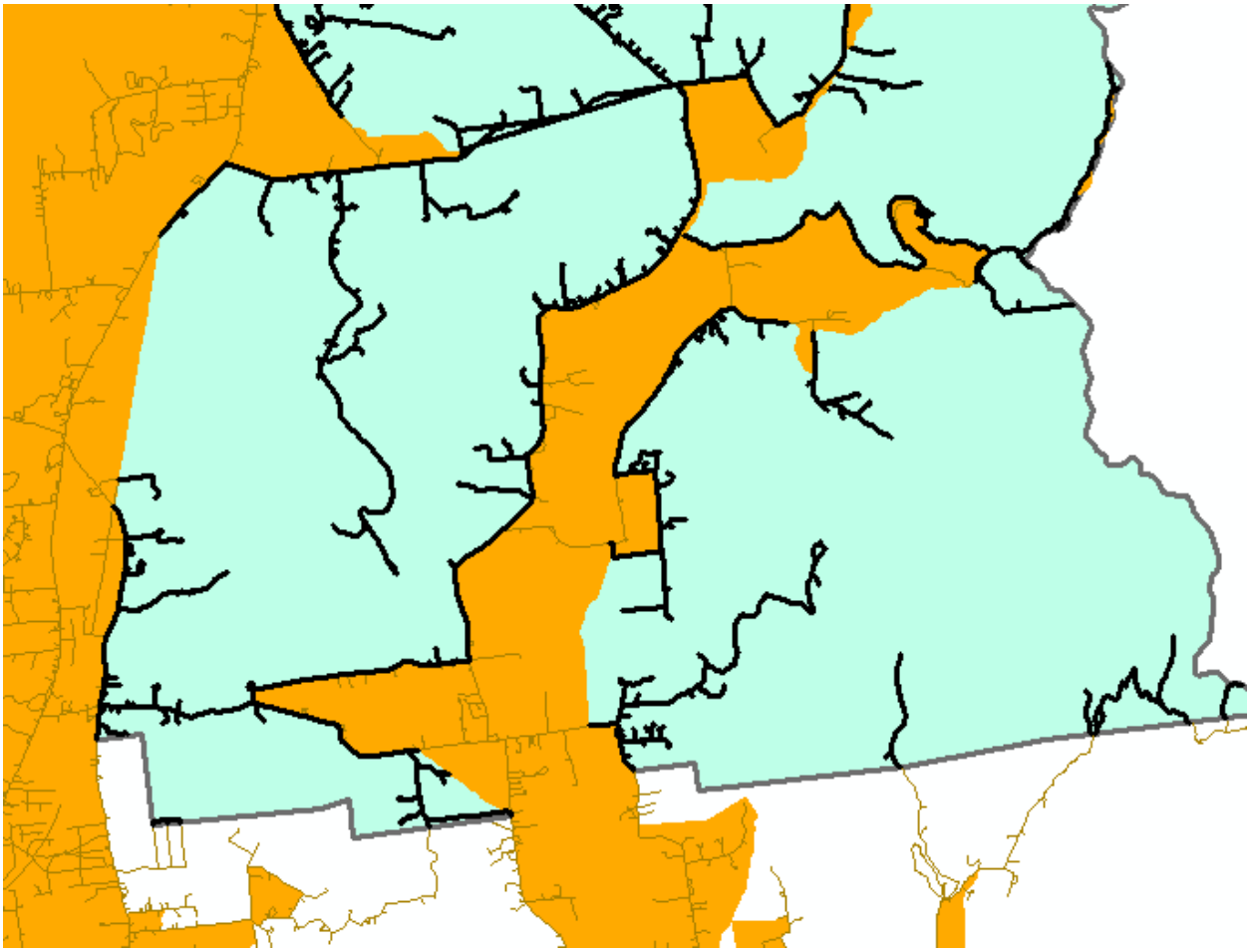


Figure 15-Output of the Segment Process

Wireless Coverage Process

In general, most providers of mobile Broadband submitted coverage information in a NOFA-compliant format. Other than attributions for spectrum and speed, little was done to this coverage.[17]

[16] An outcome not discussed here is how to handle address ranges on segments. As NTIA has asked for a Min and Max on the segment, deriving theses values for clipped segments is very problematic. Also the prevalence of alphabetic characters in addresses makes the min/max selections very arbitrary. We are grateful that addresses are nullable data elements.

Per Program Office direction, LinkAMERICA followed up with wireless providers where we determined that submitted data did not edgematch TIGER 2010 state boundaries. For the most part providers were unable to submit coverage data that edgedmatched as requested. In this case, we left the submitted data alone and did not perform any adjustments.

For providers who clip lower speeds out of higher speed coverage areas, we follow up and attempt to get revised coverage data.

LinkAMERICA continues to make aggressive efforts to bring additional WISP coverage into the NTIA dataset. For the most part, our outreach was with providers who were unable to supply sufficiently granular data in the past or those that could only submit wireless address points which is no longer a valid submission format. As stated earlier, we also work with third party service providers to getter coverage information.

Fixed wireless providers generally either supplied coverage information or infrastructure from which coverage estimates could be derived. Many allowed us to use their tower locations, antenna heights and direction/spread of coverage to derive a line of sight coverage estimate. In our experience, this is a conservative and reasonable derivation of coverage.

Some wireless providers submitted RF propagation studies. When this was done, there was a request that the signal strength be removed from coverage data. The request was honored. We note that some providers are very careful in that their coverage is an estimate of the probability of receiving an upstream link to their network. It is not intended as a depiction of any particular speed availability.

Other fixed providers were able to supply us with hand drawn maps or polygons/polylines drawn in Google Earth format. In these cases we did our best to georeference and verify the coverage areas with the WISP.

When we received coverage information in KML format, like the image below, we accepted the data as it was presented to us as the submitted coverage patterns were used in the provider advertising.

[17] Some polygon data did exceed the node count threshold. In these cases, data was rasterized to 100m cells and then converted back to polygons. The polygons were dissolved to multi-part geometry. This addressed the node count concern.

As the image above shows, in some cases we were provided hand-drawn coverage, as well as infrastructure. Instead of estimating their coverage using a line of sight or RF study, we elected to stick with the provider's supplied information. Our decision was guided by two primary factors:

If the provider is advertising using this coverage they must have specific confidence in its accuracy. If the provider can supply coverage, as well as infrastructure that reasonably supports the coverage, there is a very high likelihood in the accuracy of the information. Second the use of this coverage pattern provides an objective standard to verify against.

The downside, of course, is the polygon shown on the map may not represent our notion of how wireless coverage should appear.

In general we note several interesting trends in the wireless data. First, we can be successful in increasing the amount of WISP coverage when we aggressively pursue WISPs. This means we have to be willing to accept data on their terms and convey it into SBI formats. Some of our WISP submissions have taken over 12 hours to normalize into SBI formats. Second, we have to accept that some WISPs will not be able to supply FRNs. Third, there appears to be some variation on how the NOFA coverage definition is met. In other words, there seems to be a disparity on the necessary link budget necessary (e.g. -80 dB, -98 db, -120 dB, etc) to provide the appropriate quality of service for data services to be provided at a location/inside a location. Fourth it was very difficult getting providers to identify spectra used for

Broadband data services[18]. We are unsure if this is a competitive concern, or if the same coverage pattern is yielded for multiple frequencies. Typically, the spectra returned were those that a provider was licensed for. At this point, we have no reliable way to locally determine what set of frequencies are used to provide Broadband data services in a local area at a specific point in time.

Service Address Point Process

A handful of providers have requested that customer level, service address point data be submitted to NTIA. In these circumstances we have done minimal processing to preserve the provider's intent with this deliverable and not bias downstream NTIA use.

Our verification included checks against commercial or Public Utility/Public Service Commission exchange boundary maps. Points not contained within three miles of a boundary are not submitted to NTIA. The percentage of excluded data varies cross providers, but it tends to be under 1% of the total submission.

We retain from the provider the provided latitude and longitude, as well as Census block. For some coverage data, if a provider is unable to supply a longitude, latitude or Census block, we fill in these attributes. In those circumstances where we do not have a Census block, but we do have a longitude and latitude, we accept the given longitude and latitude and use that as the basis for our Census block assignment.

With point data we have tested for comparable geocoding success rates but do not overwrite provider information.[19] From this type of analysis we note the amount (usually little more than 10%) of addresses that seem to locate with less than street segment certainty. Deriving a thematic representation of the points on speed also illustrates some of the locational certainty issues in this point level data.

Coverage Estimation Process

Although the derivation of Broadband coverage into Census Blocks, street segments, or wireless coverage files is, in itself, a bit of an estimation process, there was an explicit estimation process required in cases where a Broadband provider either refused to participate in our survey, or provided such a threadbare submission that no carrier-based coverage information could be gleaned[20].

We typically resorted to three possible estimation paths.

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[18] One provider responded by email, "This mapping program is to provide the coverage area for Broadband provided by a company. Not to keep a detailed account of every aspect of a companies (sic) network."

[19] We will make a second geocoding pass on locations with no longitude or latitude from provider. We typically pick up ~5% from our second geocoding pass. Typically the issue tends to be address quality but also difficulties in geocoding in very rural areas.

[20] We report estimated submissions to NTIA as a non-responsive provider but we have data in the submission for them. This is the reason for datapackage.xls entries which are non responsive but contain submitted data.

For Cable (HFC) providers who did not provide any coverage information, we fell back to Media Prints data. Rather than using the entire Census Block Group gathered by Media Prints, we used only those Census Designated Places carrying the same or similar names to the Media Prints p_com field. Our reasoning was that Cable systems tend to be franchised on a municipal or at least administrative basis so the coverage will likely follow a governmental boundary. As a general rule, cable infrastructure is not available in the public domain[21] and what could be found was poor in quality and difficult to ascertain for validity.

For DSL providers who did not provide any coverage information, we estimated road-based coverage from their Central Offices[22]. We only used Central Offices that showed evidence of DSL or fiber-based services in the NECA 4 tariff. Road-based engineering areas were derived via ESRI Network Analyst to 18kft. These segments/boundaries were clipped to commercial wirecenter boundary edges.

For fixed wireless providers who provided no coverage information, we relied on their public websites to derive coverage maps. When these maps were available, we georeferenced them and tried to use the outer polygon boundary to represent their serving area. In other cases, when only a tower could be provided, we used a viewshed analysis and estimated line of sight coverage at 10mi per tower[23]. Because much wireless propagation is driven far below the Census Block and much engineering information isn't known (frequency in use, polarization of the signal, coverage pattern of antenna(s), local terrain/land cover) this was the most complicated group to estimate.

For providers who refused to provide spectrum information, we defaulted to unlicensed for Fixe d Wireless and NTIA category 1 for mobile wireless.

Speed

Speed attributes are reported both at the block (typical) and higher levels (maximum advertised and subscriber weighted). We note that in many cases, providers did not supply typical or subscriber-weighted speeds. In some cases, it appears--although we cannot verify--that their maximum advertised speeds were used to populate typical speed columns.

We do have limited testing data on reported speeds, but we have been careful to not use our typical reported values with carrier-provided information. If we do not have a speed value from a provider, we report an empty value.

Several service providers claim they do not have data on typical speeds available, but estimate a 20% overhead factor between the advertised speed and what may be experienced by an end user.

[21] The team tried to use data from the FCC Coals system and 321/325 fillings but this seemed to be a bit non-uniform in quality.

[22] Central Office location was derived from GeoResults. Wirecenter boundaries also came from this commercial product.

[23] In some cases we had an approximate radius of coverage but no height. In this case we used a 50' height estimate and then clipped the coverage to the provided coverage range. We also clipped wireless coverage to honor state boundaries but did not look for providers serving coverage with out of study state facilities.

As a general rule, in circumstances where a provider supplies a range of speed attributes, we assign NTIA categories based upon the midpoint of the range. We follow this rule unless we can determine other grantees are handling the same submitted information differently.

To support NTIA program office requests, we have also modified the structure of the Service Overview table. Even if Maximum Advertised Speed is supplied at the market or county level, we push that speed down to the contained Blocks. The only records that remain in this table, will be those wireline records with either a non NULL nominal weighted speed or ARPU value.

Middle Mile

Middle Mile information was collected directly from providers via survey or interview. Middle Mile is a "chicken or egg" type of challenge in that it is possible to verify that the infrastructure exists, but extremely difficult to know what the site is doing without engineering level assistance. Although most providers submitted "something," there was a significant variance in what that "something" represented.

The purpose of this section is to record some of the comments and questions we have received about Middle Mile. We hope this provides better context for our data submission.

Within the NOFA, Middle Mile was defined as (a) a service provider's network elements (or segments) or (b) between a service provider's network and another provider's network, including the Internet backbone. (Collectively, (a) and (b) are "middle-mile and backbone interconnection points.")[24]

Given the existence of the "or" in this definition, providers submitted a variety of information. Based upon the NOFA example, several fixed wireless providers interpreted Middle Mile in terms of the connection points from their towers to their own serving backhaul location. The topology was commonly Microwave from their distribution towers to their NOC. The NOC and towers were listed as the Middle Mile points. This seems to be consistent with the first definition clause (a).

Telephone, Mobile Wireless, and Cable providers tended to remain either silent on the question, or would provide a single location in which Internet peering occurred (clause b). A number of participants explained that the NOFA was quite ambiguous with data traffic moving back and forth over both TDM and IP networks--it was unclear where the distinction should be drawn. As a general rule it seemed like many providers listed a single location where Internet Peering occurred.

A number of providers refused to answer the question on grounds of confidentiality[25]. Others would not disclose as their Middle Mile points are not owned--another company provides the physical and

[24] From http://broadbandusa.gov/files/BroadbandMappingNOFA(FederalRegisterVersion).pdf at 54, visited March 28, 2010

[25] As received in email 9/30/10, "Due to security concerns and the risk of public disclosure of highly sensitive data, whether inadvertent or otherwise, ***REDACT***response to the Middle Mile and backbone interconnection request is limited to publicly available information available on {remainder not included}"

electronic connection to their network. In other words, the entity providing Broadband is not the entity providing Middle Mile.

Additionally, based upon the new Provider Type classification of "other," we have started to integrate points provided by Broadband service providers not meeting the NOFA definition. This includes POP locations and aggregation points for public / private networks.[26] Within a given submission there were two final attributes that tended to concern respondents. First, speed should be measured in terms of only data capacity and what exactly is "data" (e.g., can/should you segregate out voice or video), and is the relevant capacity of the physical connection, channelized to a specific virtual circuit on their network.

Finally, a number of other providers were unsure of the height above grade measure (is this their floor, the street outside, etc). We seem to have a combination of height above or below grade, as well as heights above mean sea level (AMSL).

To the extent possible in our timeframe, we verified the location of a sample of Middle Mile points. Where we could see infrastructure that appeared to be consistent in location with other provider infrastructure, we felt that the location was accurate. In some cases, the point provided seems sensible (is on a road, near other equipment), but using imagery, we couldn't find a place where this type of connection could occur. This wouldn't be unforeseen, in that Middle Mile connectivity likely takes place in a protected environment much smaller than a standard Central Office installation.

Mobile Wireless Coverage

We have received mobile wireless coverage from most mobile Broadband providers in each state. At this point we have cleaned the geometry of the data and attributed it with spectra, NTIA speed categories and FRN as required.

Where possible, provider derived coverage has been reviewed for consistency against the commercial licensed product. To a limited extent we also use licensing locations and tower infrastructure to spot-check supplied coverage. This mode of verification remains complex, given the lack of facility-based information with mobile wireless.

Finally with respect to mobile Broadband services, we note several trends.

First LinkAMERICA used the NTIA supplied frequency tables to report speeds consistent with other grantees. In circumstances where a provider supplied a range of experienced speeds, we used the portion of the range consistent with the most frequently reported Grantee value.

Second where a provider reports multiple frequency bands in use but doesn't distinguish these bands by submitted SHP file, we submit identical geometries but attribute one geometry to each submitted spectrum value.

[26] As discussed in our readme.txt file, a number of middle mile points were lost in validation due to their location in adjacent state. This will cause a decrease in some providers relative to prior submission.

Third we are seeing a trend toward increasing Broadband speed. As of this writing, there is not consistency across providers in how they attribute the advertised 4G speed values. In other words, for some providers 4G means advertised speed categories increase. For other providers the speed value did not change.

Fourth, we have requested providers submit SHP files that are consistent with the TIGER 2010 boundaries. For the most part, providers have not done this. We have not modified the submitted data to impose the TIGER 2010 state boundary.

Verification

Data verification is an ongoing and evolving process. Clearly, with each new data submission there will be a validation process at hand and at the same time, our team continues to expand and improve the efficiency and effectiveness of our data verification routines. Consistent with the movement toward an fGDB export database and use of a data receipt script, much of our validation effort is spent in supporting the ETL processes into the required formats. In future data submissions we will continue our work to stabilize and improve the business process that normalizes provider submissions into NOFA formats.

Verification Methods Summary

Our overall verification standard is focused on the level at which we supply processed data to NTIA. This means that the vast majority of our verification process and resources will be focused on verifying provider identity, coverage, advertised speed and appropriate metadata for Census block's less than or equal to 2 square miles.

We believe three broad verification themes are important to consider

a) The first step of broadband service verification is a consistently applied market definition—we call this provider identity verification.

b) There is probably not a single dispositive method of verification. Rather, a number of verification approaches are needed to appropriately classify confidence in data submitted to NTIA.

c) Verification approaches tend to meld together. As an example a web survey is complimented by a phone survey but expert review and external data may be necessary to reach a final informed judgment.

The table below demonstrates the various methods used across each feature class submitted to NTIA.

	Data Types			
Verification Method	**Census Block, Road segment or, address specific service**	**Mobile wireless service availability**	**Middle mile infrastructure locations**	**Community anchor institutions**

	availability			
Provide/Subscriber Identity Verification	METHOD USED	METHOD USED	METHOD USED	METHOD USED
Internal data consistency check	METHOD USED	METHOD USED	METHOD USED	METHOD USED
External data consistency checks	METHOD USED	METHOD USED		
Carrier confirmation	METHOD USED	METHOD USED	METHOD USED	
Public review	METHOD USED	METHOD USED		METHOD USED
Anchor institution review				METHOD USED
Expert review	METHOD USED	METHOD USED	METHOD USED	METHOD USED
Telephone sampling				METHOD USED
Purchased Datasets	METHOD USED	METHOD USED	METHOD USED	METHOD USED
Developed Datasets	METHOD USED			
Web-based surveys	METHOD USED	METHOD USED		METHOD USED
Field Surveys	METHOD USED	METHOD USED		METHOD USED

The following table defines each of these methods and provides a summary of why this method is used, and the value we gain from it.

	Definition	**Methodology**	**Purpose**	**Benefit**
Provider Verification	Provider verification is the process of assembling a	Provider verification involves combining multiple data sources,	Without a consistent understanding of the provider	The main benefit of this verification process is understanding who is providing broadband

	broadband provider database, determining which providers are properly classified into SBI eligible providers and developing contact information.	interviewing providers and classifying the broadband provider type.	'market' it is impossible to appropriately classify the coverage data. It is also impossible to explain to consumers of the data why a given provider is or isn't available in the submitted data.	services, are the broadband services NTIA compliant and how do you 'contact' this provider (Name, DBA, FRN, Holding Company)
Internal data consistency check	An internal data consistency check is a validation measure across at least two dimensions. First is the provider data consistent with prior submissions. This would be an examination of this submission relative to a prior submission. Second is this submission consistent with the technical specifications of the service offered.	Most of this validation is performed using our spatial databases and running queries that compare submissions. We also use a similar set of queries to isolate transmission of technology outliers. These would be data sets which offer speed technology combinations which are unusual relative to other data received across all states.	The purpose of this type of validation is to understand how things change over time and why. It also helps inform us for circumstances where we have data points which appear to be outside of the norm. If these outliers are detected, they can be pursued directly with the provider.	The main value is understanding why something changes and providing an opportunity to engage with the provider to understand why there has been a change.
External data consistency	An external data consistency check is a measure of	External validation can be performed by verifying	We don't believe a single,	External validation provides an external measure of data quality

checks	the provider data against external sources (not from the Provider). The distinction between internal and external isn't pure, but our typical experience has been that External checks involve the acquisition of additional data sets and a comparison across multiple sets.	supplied coverage against third party data sources. An example would be to test provider claimed DSL Census blocks against a commercial source of exchange boundaries. Wireless coverage is also compared to radio locations.	exhaustive third party data set is available for validation. We do believe a combination of external datasets can be used to inform and help filter out the false positive cases from provider data. We also note that the external data appears to diminish in accuracy as the area of analysis becomes less urban.	assessment not influenced by internal data sources. It can be one of the more effective means of isolating false positives in submitted data.
Carrier confirmation	Carrier confirmation is the process of sending processed data back to the service provider to ensure that translation into NTIA formats is fair and appropriately accurate.	We use two techniques to accomplish this. First a provider's data is summarized in a tabular format. This lets the provider quickly verify firm information (FRNs, DBAs, counties served). We also develop two sets of check maps. One is a PDF version and the second is a	One of the more critical steps in broadband mapping is translating carrier supplied data into NTIA formats. Providing verification deliverables to the service provider (carrier) is an	Carrier confirmation gives the provider information on how their data will look when submitted to NTIA. It also helps short circuit complex problems like online map display problems—which tend to come from FRN issues or incorrect data entry. This process also helps to strengthen the sense of ownership and participation with

		Google Earth (KMZ) version. Both versions display the NTIA reported coverage and speed. A different map is developed for each technology of transmission	important external feedback process. Several providers also ask us to repeat this process before data are submitted to NTIA so they can see what will be submitted to NTIA.	providers.
Public review	Public review is the process of collecting structured feedback from the general public in a manner which can be analyzed and used to improve/validate the submitted data.	Currently we use an online map 'layer' which provides consumers the ability to feedback about the coverage and provide in depth information about their concerns. The maps are also discussed within the context of planning teams within each state. We receive feedback from these meetings.	As with other crowd-source approaches the intent is to allow the general public to feedback and improve the displayed and submitted data.	The benefit is to provide feedback and also display the comments of the general public. As a mechanism for validation the key is to develop feedback data which is structured in way that informs the mapping process.
Anchor institution review	Anchor institution review is targeted surveys intended to better understand the Anchor Institution	We have used three methods to verify anchor institution data. The first is a targeted series of	As Anchor Institutions represent a different class of coverage information as	Because CAIs represent a very distinct stakeholder community, building identifiable connections between the SBI program and the anchor

	broadband market.	telephone calls. The second is specifically targeted mailers. The third is direct interviews with stakeholders. Schools for example, may have someone at the state level who maintains information about broadband connectivity.	well as a very different type of end user, a focused stakeholder management, data acquisition and data review process is advantageous.	institution community is important. Tailoring a specific data acquisition/ data review process helps Anchor Institutions establish a reliable set of infrastructure benchmarks which they can use to fulfill their mission.
Expert review	Expert review is the process of using subject matter experts to review submitted or processed provider data.	The method of subject matter review will be dependent upon the type of data in question. In the past this has taken the form of conversing with a wireless engineer to ensure that the coverage pattern appears plausible for a given technology. It may also involve a cross check on data from a second source—can this type of middle mile infrastructure support the maximum advertised speeds in this area? SME validation is also helpful trying to	The purpose of expert review is to get a second opinion regarding some aspect of submitted or processed data. Given the large number of submission formats and innovative ways to supply broadband, it is always helpful to have multiple sets of eyes available to reduce errors from misunderstanding.	The most significant benefit is to have a secondary source for back checks and verification. For the most part expert review is from an engineering or deployment resource. Expert review also helps support process transparency so there isn't a closed GIS driven process making all the decisions.

		understand ambiguous information in submissions.		
Telephone sampling	Telephone sampling is the process of using targeted phone calls to verify aspects of submitted or processed data.	Telephone methodology tends to be consistent across the type of data being verified. A subject location or individual is identified. The phone number for that location is identified and a call is placed. The person performing the survey asks a scripted set of questions and records the responses in a database. For example, our team produces a survey to develop and monitor access and use trends at a regional level.	The purpose of a telephone survey is to gather in depth information from a targeted respondent. We would likely use telephone survey for targeted purposes--either clarifying anchor institution data or randomly polling consumers to better understand attitudes.	The primary benefits are to develop in depth information as well as surveying a large number of respondents regarding opinions or behavior. Phone surveys tend to be more helpful to survey attitudes or to find out location specific information. Telephone sampling is used in our CAI and consumer surveys.
Purchased Datasets	See external data consistency checks.			Also note that not all external data checks must be purchased. For example Census data could be used for an external consistency check but it is freely available for download.
Web-based	Web based	In the case where a	The purpose in	The benefits of web

surveys	surveys can involve three dimensions. First a web survey (a form available to be filled out on the Internet) can be used to supplement and better understand consumers. A web survey could be a compliment or a substitute for a telephone survey to target a specific demographic (a web survey can also be part of a social media campaign). Further web surveys can be used to verify provider information.	web survey is a compliment to phone or in person, a survey instrument is developed and then respondents are invited to complete the form. In the case where a survey is a mechanism to gather additional information from provider web sites, this could take the form of manual queries (looking for address listed in a Census block) or automated scraping where information is pulled from a website via a specific web application. We currently use both approaches depending on our goal.	all cases is to gather additional information via the Web.	survey are its relatively low cost as well as the ability to gather specific information into a form that can be easily used by downstream work processes.
Field Surveys	A field survey is sending a team of skilled participants into the field to verify submitted data or sample some aspect of the environment in a given area.	Field survey methods involve assigning a field team, equipping them with data acquisition hardware, ensuring they have a consistent skill basis and recording	Although expensive, field surveys are sometimes the best way to verify information such as provider equipment	The benefits to field work are significant. They can help us better understand the exact phenomenon in a particular area.

	observations. To date most of our field survey work has been in engaging CAIs into the process. In Q2 of year 4 we are preparing to launch an app for download to mobile devices with the intent of testing mobile wireless speed and access.	presence or the strength of a wireless broadband signal.

Verification Standard

Verification is a broad term, but in our definition it boils down to determining if broadband coverage is in the right place. For a given provider, the question is whether the coverage is assigned to appropriate Census Blocks, road segments or area features. Coverage verification can be further broken out into two distinct classes:

Technology verification, which is determining if the provider is listed with a technology consistent with their marketing information.
Speed verification, which is determining if the speed supplied for that block, road segment, point area file or market area is consistent with the technology and the marketing information received.

The final verification dimension is consumer feedback and crowd-source verification. This is a dynamic set of steps we are beginning to implement. One side of this is responding to consumer concerns. The second is using the crowd sourced data to validate provider claims and, if appropriate, update the map and the underlying data.

At this stage, our working hypothesis (confirmed by our experience) is that there will not be a single measure to indicate broadband coverage availability in a Census block or along a segment. From prior work, and examining our current provider submissions, we believe that there is too much variation below the submitted record to make a single binary yes/no indication. Rather, there will be a series of measures that combine to provide qualitative confidence (a classification scheme) in our indication of Broadband availability at the block, segment, or wireless polygon level. We believe such a qualitative classification scheme is both relevant to and supportive of NTIA interests, as well as the interests of our end-user community – that is, the states and citizens we serve through this program.

The intent of this section is to illustrate why our team is moving toward a particular verification methodology. Our team is learning as we go along, and will adjust and improve this thinking. But given our experience to date, this is our path. As stated above:

First, coverage verification is at the level of data submitted to NTIA.
Second, coverage verification is enhanced when there is a secondary measure of availability (such as infrastructure presence or serving area boundaries)
Third, given the limited resources of this effort, the most important coverage verification process to implement is the erroneous dispersion of coverage. These are the "islands" of coverage isolated by significant distance from other covered areas. In other words, Broadband Internet likely doesn't exist far away from other areas with Broadband Internet access supplied by the same provider.
Next we present several examples which illustrate the complexity of coverage verification.

The first example is taken from a gentleman who requested a map change in Alabama. His home is near the yellow dot. The darker grey Blocks are covered Census Blocks. The black lines are covered road segments. He cannot receive DSL from his incumbent provider, although his neighbors can. The incumbent carrier does have at least one structure in that block from which Broadband services can be provided; unfortunately his home is not served.

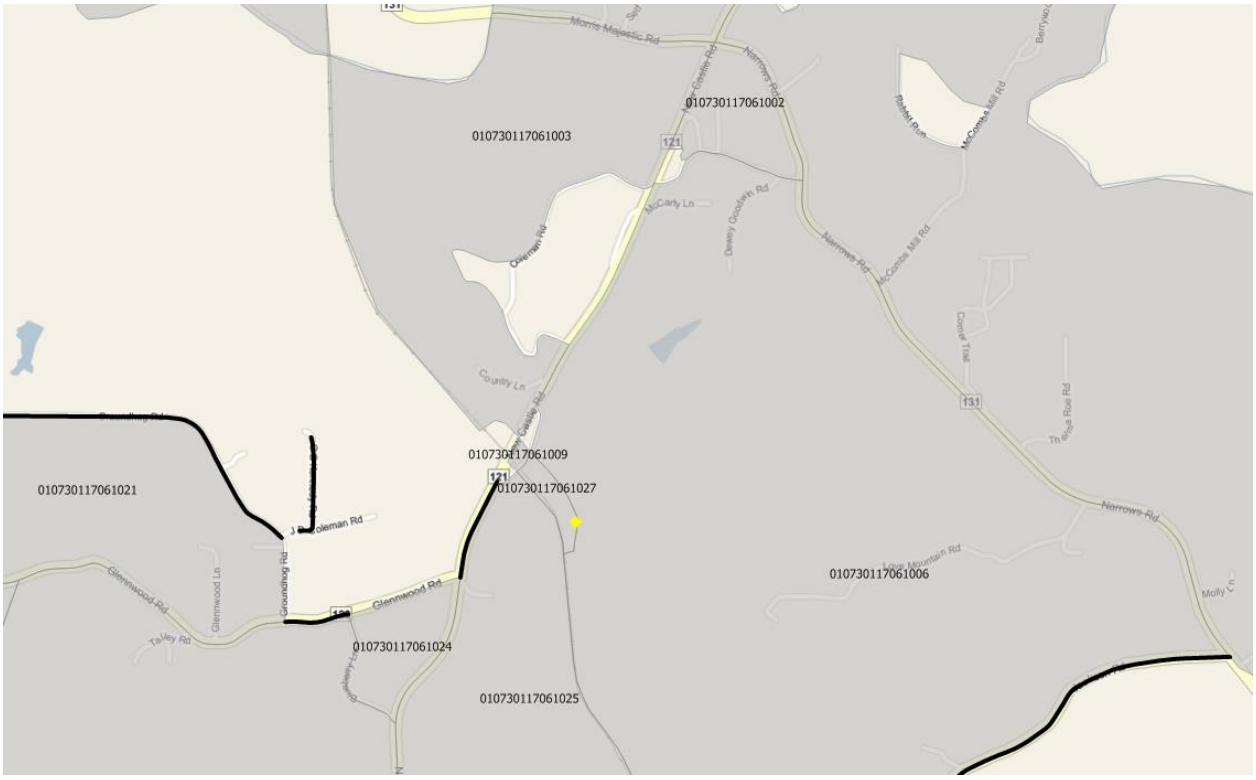


Figure 16--Sub block variation

Because the SBI program requires the depiction of coverage at the block level, the above map has been correctly generated. However, from the customer's point of view, the map is inaccurate. This requires

us to explain that the maps are not intended to be a structure-level qualification, at which point some consumers question the value of the maps when seeking service information.

Beyond this type of one-off structure-level qualification, sometimes, as shown below, we have even larger gaps in provided coverage. The image here shows an "outlier" block that could be an error, or it could indicate missing Blocks along a major road that should have been filled in. In this figure, the outlier block is highlighted in turquoise.

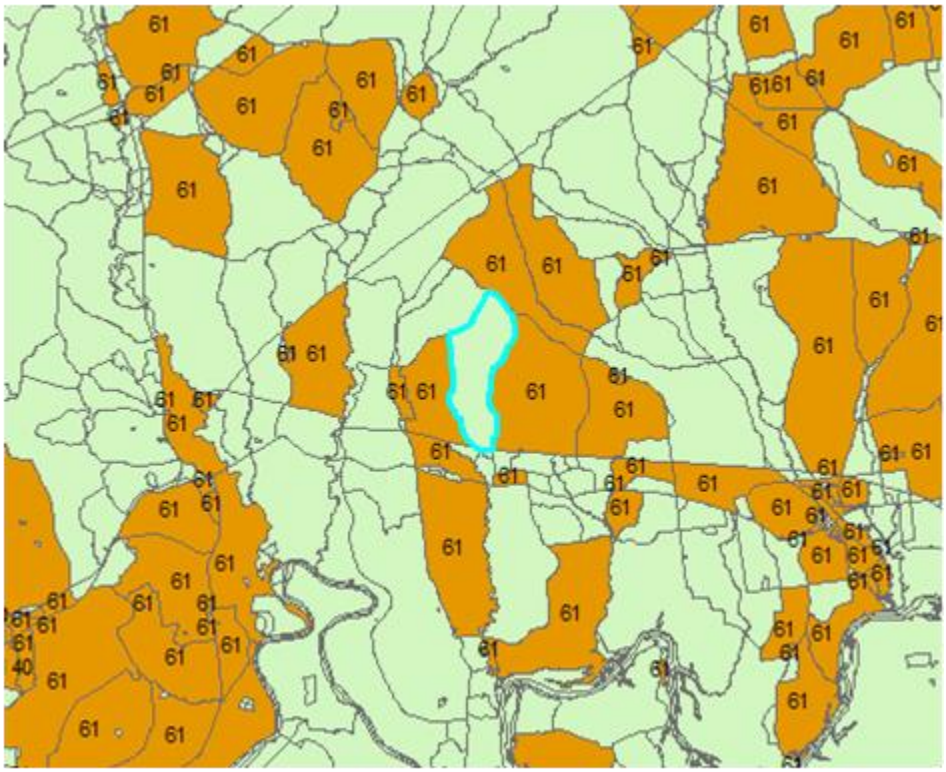


Figure 17--Dispersion in Submitted Data

In this particular case, we are faced with a different verification question. Based upon the properties of the neighbors, we believe this block should likely be covered (coverage interpolation,) but supplied data from the incumbent says otherwise. Although we don't have information to know how much of the data submitted to us is generated, our sense is that geocoded customers or plant are used. In this case the block dispersion could be the result of a side of the street assignment rather than an availability assignment. In other words the data may speak to where is working plant rather than where could service be provided in 7 to 10 days.

The next example shows where an interpolation process could require some adjustment. The figure below shows a town level view. There are some smaller Blocks that are likely covered by interpolation logic, but we also do not want to extend coverage beyond a franchise boundary as in the areas shown in a box on the bottom of the map.

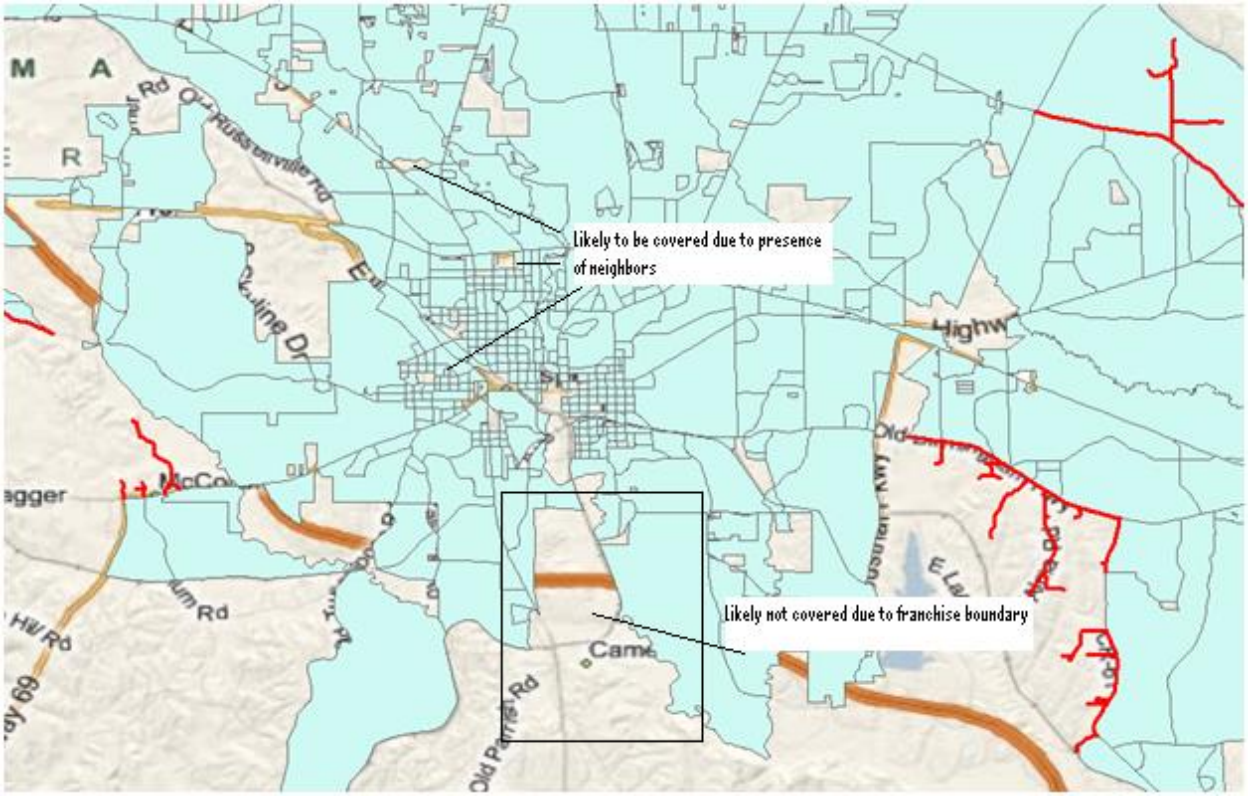


Figure 18-Where do you stop interpolating?

From what we can gather from some providers, the submitted data—data with consistently high degrees of dispersion or coverage holes—tends to come from geocoded billing records. In this paradigm, this means where there are no billing address points; service is not identified on a map. The interpolation verification question then takes on three dimensions.

First, if a provider has no customers in an area, how can we know if they would be able to provide service in a 7-10 day interval?

Second, if we use the properties of neighboring Blocks to interpolate coverage, when should we stop (e.g., at a franchise boundary, at a certain distance, etc.)?

Third, if we are comparing to a data source that examines coverage at a higher level (such as 477 Tract) do we use the Tract information to assign information block level coverage or do we use the tract coverage to filter out dispersions in coverage?

We continue to work with providers to get additional information to help us better understand and contend with this type of circumstance. However, we have not been entirely successful at getting franchise/service area boundaries that would address much of the issue.

The final map shows this dispersion problem, but to an even larger degree. This solitary large block is likely the result of a bad geocode, but we don't know, given the data that has been submitted by the provider and the "single customer in a block standard" set by the NOFA clarification.

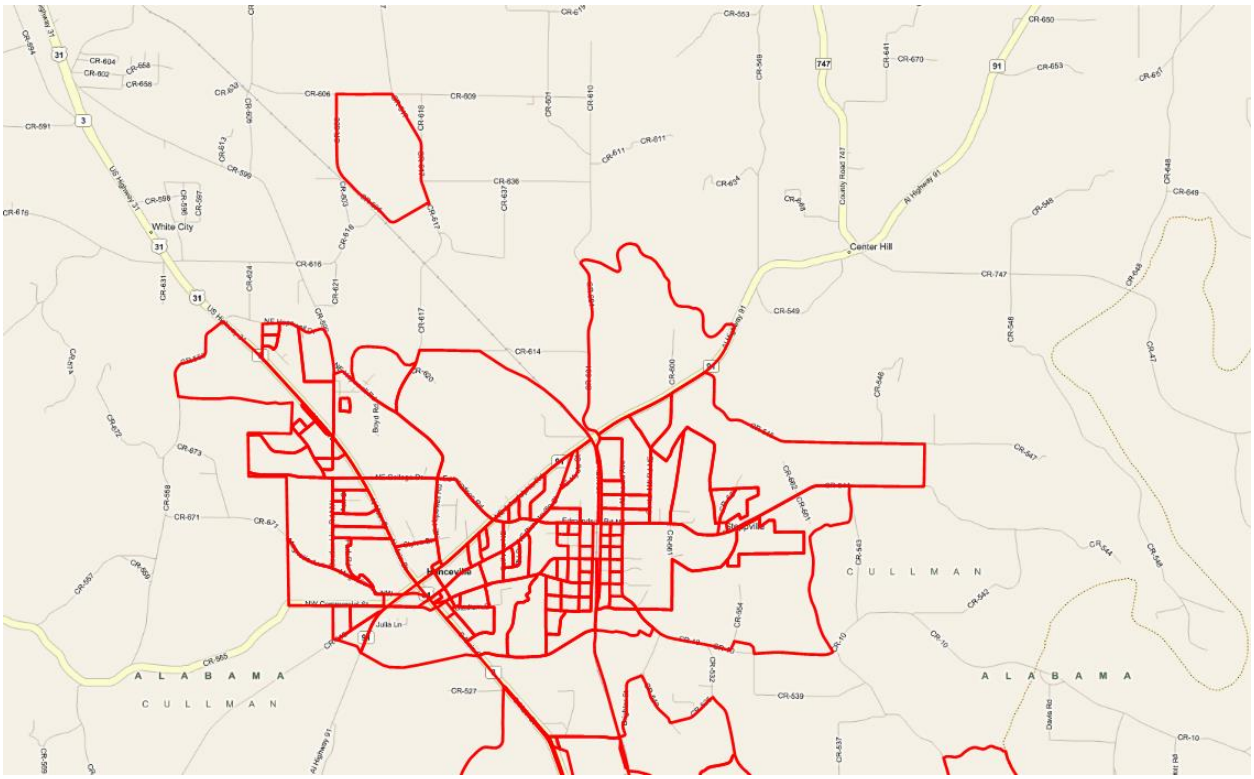


Figure 19-Dispersion in covered Blocks

Due to the fact that this situation is quite obvious in display, this type of problem is one that we are more aggressively trying to resolve. Where a single block has no neighbor offering comparable coverage and is a specified distance beyond an exchange boundary, our approach has been to filter these Blocks out. As of now, this filter is limited to incumbent xDSL providers because we have a good source of exchange boundaries.

The exchange boundary dispersion verification method breaks down when examining providers who are more likely to CLEC into neighboring territory. In the figure below, the black line represents the exchange boundary, while the continuity in the DSLAMs likely points to coverage extending along a road into another provider's territory.

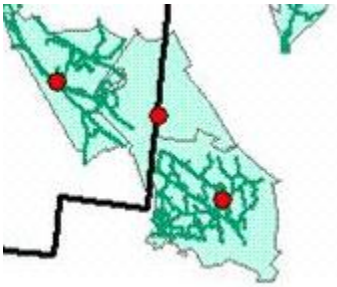


Figure 20--DSL Coverage outside of exchange boundary

In sum, the variability in our source data continues to suggest that our dynamic verification process is relevant, appropriate and evolving in a manner consistent with the overall program. And, as noted above, we believe the more meaningful outcome of our verification processes will likely be a series of qualitative indicators or expressed confidence levels. Our concern, as with the development of any sort of classification process, is how rigid we should make this classification given the variation in our input data and the varied perceptions of service providers, map viewers and down-stream data consumers.

Verification Work Process

To support our dynamic multi-factor verification process, we have implemented the following steps.

Between submissions our provider relations team works to analyze our current broadband provider ecosystem and capture any changes such as acquisitions, mergers or cessation of operations. They also remain in touch with providers who have indicated when follow-up is necessary. The team confirms that the providers who submit data are NOFA compliant. Given these steps they begin a survey and awareness campaign to get data submitted for the program.

When data is received, an analyst reviews the submission and any immediate questions or concerns are sent back to the provider as quickly as possible. We have found this gatekeeping step very helpful in making sure we understand the intent of the submission.

For all providers who submitted data to us in the prior round, the provider received both a tabular data summary and mapped output[27]. Prior to releasing the "check maps" to providers, we inspected each provider's coverage area. After this in-house review, we solicited a second level of feedback from providers and received a number of requested changes and corrections used in the development of the current dataset.

For those providers who submit only block or segment level coverage (i.e., in those cases where we have no infrastructure to test with) we test for coverage containment within known service boundaries. The intent of this validation step is to remove Blocks that are obviously erroneous.

We have also begun to perform a mechanical test against wireline providers. This is an examination to ensure that each feature submitted has some neighbor within 1 mile. We are testing this process to try to understand what the neighbor distance should be. This has proven to be a difficult process.

We also verify the submitted speeds against the typical speed ranges in the NTIA frequency tables. If we note a value outside of typical range, we ask the provider for clarification. These responses are recorded.

As mentioned in the sections above, we have implemented a check on dispersed Blocks, but we have implemented less with respect to coverage interpolation (holes in coverage). We continue to work on a

[27] For the verification of round 3 data, we submitted both PDF and KMZ (Google Earth) format check maps. Some providers prefer to work with the Google format as it supports easier modification. Others continue to submit marked up PDFs.

series of mechanical tools to assist with the inspection process but have run into challenges related to geographic basemap and timing.

As our submissions have moved online, we have also begun to benefit from crowd source feedback. In some cases this has helped us identify and fix errors in our underlying data. In other cases, as we have shared with NTIA, we have encountered some perceptual issues rooted in how the data are developed and modeled to comply with the NOFA. Depiction of uniform coverage in Census Blocks continues to be a challenge. Despite our best efforts to explain the full block coverage requirement, we continue to receive complaints that the coverage shown on the map is not accurate for a particular location within that block.

Cross Submission Validation

As part of our validation process, we compare submitted data from the current submission to the submission prior. This is an automated review in that all providers are examined in terms of submitted record counts and count/technology/speed combinations.

Sprint	**1**	**2**
80	**1**	**2**
3	1	1
6		1
StarBand Communications, Inc.	**1**	**1**
60	**1**	**1**
4	1	1
Starlite Computers	**1**	**1**
70	**1**	**1**
5	1	1
TDS	**27884**	**27716**
10	**27878**	**27716**
3	6219	4538
4	1761	2036
5	8778	8767
6	833	899
7	9023	10368
8	1264	1108
50	**6**	
8	6	
TEC - Cherokee Division	**1828**	**2012**
10	**1239**	**1352**
5	426	479
6	212	314

Our team reviews the changes to make sure the scale of the change is consistent with our expectations given modified survey data.

We then take a second pass at the same submission summary data to review any providers who will be flagged by the submission script. Again this comparison is made between the current and prior submission.

A	B	C	D	E	F
DBAName	TRANSTEC	MAXADDC	Round	RcdCnt	Lyr
AT&T Mobility LLC	80	7	7	1	WR
AT&T Wisconsin	10	7	6	33911	CB
AT&T Wisconsin	10	7	6	45	SG
AT&T Wisconsin	10	7	7	38	SG
AT&T Wisconsin	10	7	7	34213	CB

This second pass helps us to prepare documentation for our readme.txt file. It also helps us monitor where there have been large speed changes by provider. Where we do see changes , we contact the provider to understand how the networks in place support the speed reported. We also cross check advertising materials to make sure the reported speed is being actively marketed.

Consumer and Provider Responses to Deliverables

Here, we segue from internal verification to external verification. We view responses to our work product as a form of validation and verification. On the one hand, this gives us the opportunity to fix mistakes and then generate QA steps to make sure that the problem does not reoccur. We also learn how to improve what we are doing or better explain what we are doing to a community not always familiar with the NOFA and program office framework. On the other hand, listening and learning from this feedback helps us better target our mapping deliverable to meet the needs of our external customers. In this second case, external feedback not only provides feedback on perceived qualities (or lack of quality) in the data, it helps us to learn if we are developing data that is truly helpful to downstream users across a wide range of usage and intent.

At this point, our external deliverables take three forms: State Broadband Maps, data transfer to NTIA used for the National Broadband Map, and text format data requested by outside parties.

Online Map Experiences

With our State maps online, we continue to harvest viewer feedback and comments. Because an online map allows someone to zoom in far below the scale of the data, comments reflect sub-Census block concerns. While important to the citizens reporting these issues and to our Broadband planning teams, this level of data is outside the scope of our core validation process, which as noted above, is focused on the level of data submitted to NTIA.

There are several other themes that our team believes are important to share. These comments are actually quite helpful because they also improve our data processes to better meet the needs of map viewers. For example, we have invested significant time in harvesting more segments from provider data. Because the appearance of segments is so important, we are putting time into ensuring a visually appropriate edge match between the roads we harvest and the Blocks/roads we will show online. On a

technical level, we also believe that a good segment process will help us understand more about dispersion in the data, and what is valid versus what is not valid.

Our team reviews the online comments on a periodic basis.

Online Display of Consumer Feedback

We have completed development of a consumer feedback layer for our online maps.

The intent of the new layer is to show viewers the feedback of other map viewers. This layer went live after the Round 4 data was posted.

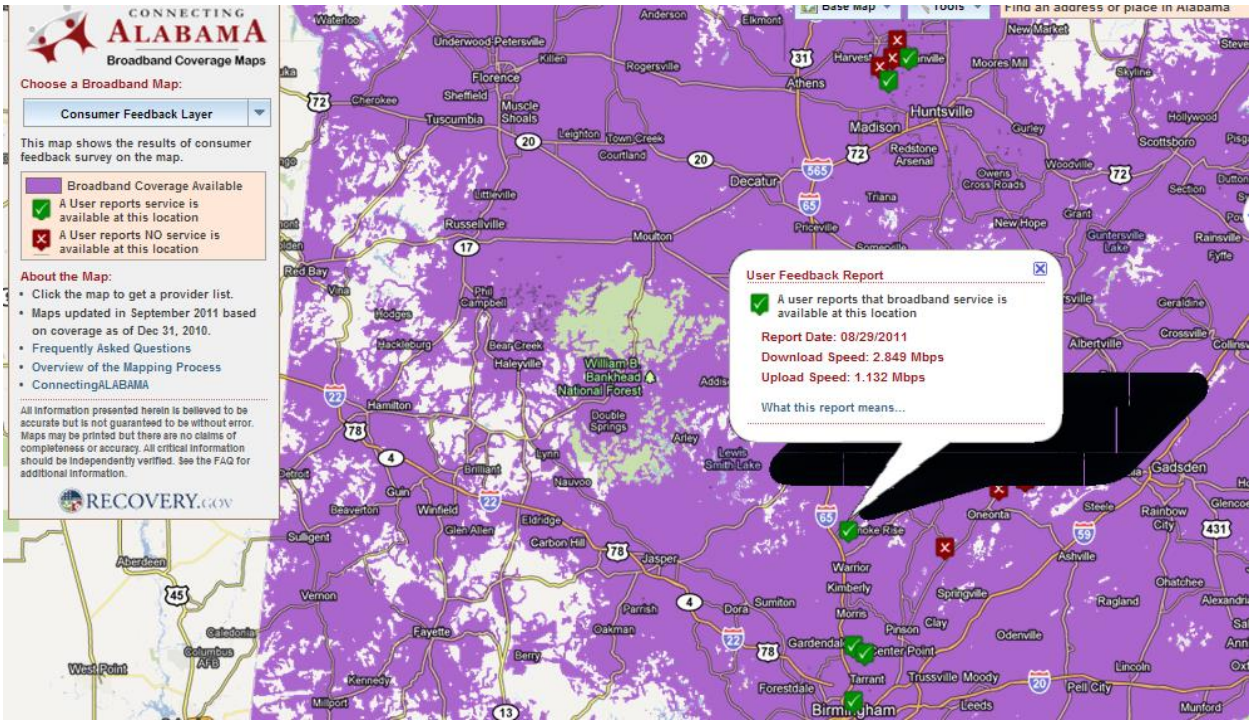
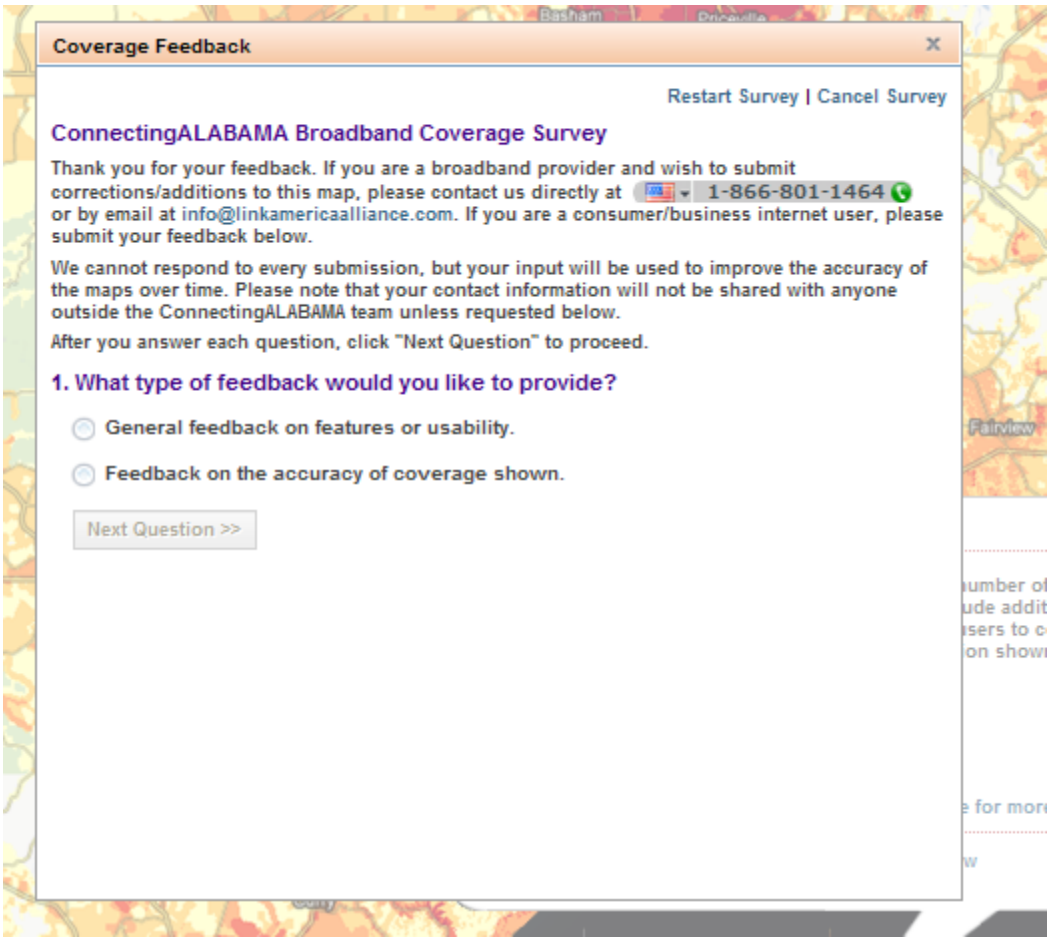


Figure 21--Consumer Feedback Layer

To gather feedback, we use a survey wizard which asks the end users to categorize their concerns. The survey went through several iterations of design and usability testing. Our experience has been unless we get a way to constrain the user feedback into manageable categories, it becomes very difficult to act upon.



As mentioned by other Grantees we struggle with how to use all of the feedback we receive. The qualified data points seem to fall below a volume in which we can infer significant modifications to the map data. Nevertheless, we believe it is important to gather structure and display the feedback to support project transparency.

Perception of Unfair Treatment Across Technologies

Several Broadband service providers have expressed strong concerns regarding how wireline services are displayed, as contrasted to how wireless coverage is displayed. This is an artifact of the SBI data model. As an example, consider the figure below.

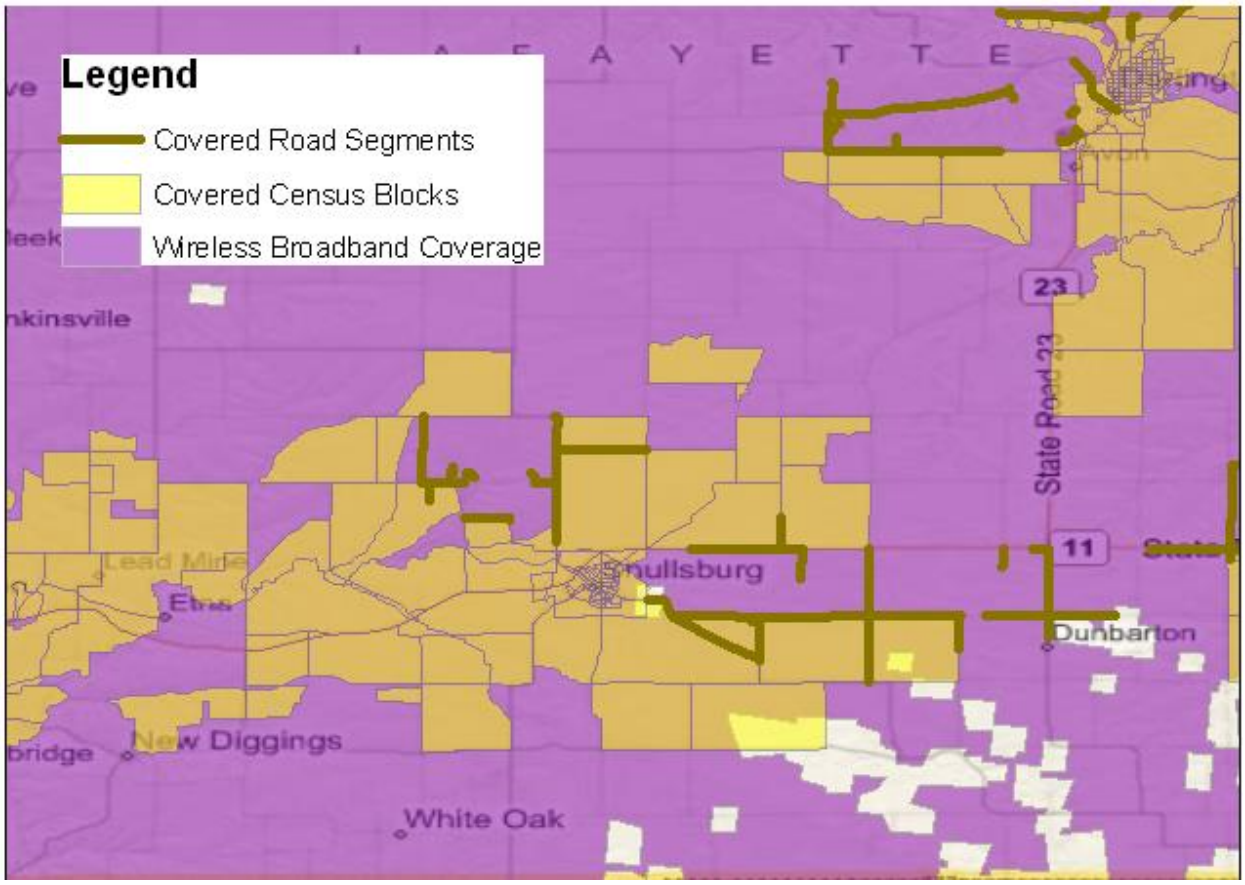


Figure 22--Multi Network Coverage portrayal

In this image, covered Census Blocks are light gold. Covered road segments are a darker gold and wireless coverage is purple. The concern seems to come down to how a wireline provider's coverage is shown in the large Census Blocks (greater than 2.0 sq mi). Some wireline providers have expressed dissatisfaction because their coverage is only tied to road geography, which leads to a visual "hole" in their coverage map. At the same time, they feel that it is unfair that the wireless provider's coverage is shown to be uniform in the same area. Put another way, if our maps show wireline in terms of Blocks and segments, why don't our maps show wireless the same way? This concern is getting amplified because wireless speed does not vary by block whereas wireline does.

Loss of Geographic Granularity

Some providers particularly those who submitted facility level information are disappointed when we have to roll the derived data up to Census blocks or road segments as this changes the appearance of their service areas. This is especially important in rural areas where the larger blocks represent more of the service territory. Further, the FCC Order requesting service level boundaries has made some providers unhappy when submitted block level information does not line up with their service areas.

Perceptions of Carrier of Last Resort (COLR) Obligations

Some wireline providers have also expressed dissatisfaction because online maps limit the distance of coverage from a road segment. In our current online maps we buffer a wireline carrier's service 300' from road centerline. A number of providers have expressed that they are mandated to provide voice coverage (which Broadband will accompany) anywhere in the Exchange. There seems to be many dimensions to this argument, but the basic concern comes down to not being able to accurately reflect the scope of their COLR obligation within the mixed block/segment view. Their ability (or lack thereof) to actually provision such services for new users within a 7-10 day period adds yet another level of complexity when attempting to fairly portray their coverage capabilities.

Intentions of Coverage Mapping

When a viewer of an online map clicks on the map (or zooms to an address), they are provided with a pop-up of service provider coverage in the area. The critical question is this: what is the area to which that pop-up window responds to? In the past, we reported back to the specific Census block, or buffered road segment intersected by the user click. As far as the map was concerned, once we move off of that road, or out of that segment, we have a new area to examine.

Our sense, given feedback received, is that our provider view should be a bit more tilted toward finding providers in a general area, rather than finding providers at a single-click location. If the goal of the map is to get someone to call a provider for service, our bias should be to include all of the potential providers in the general area, rather than giving potential customers a method to self-disqualify. That is, we want to cast a wider coverage net, rather than one too narrow. The problem with this approach is that it will create a number of false positive Broadband reports. As of this date we cannot determine if the claims of inaccurate coverage in online maps are due to the looser provider view standard or not. We keep this looser standard in place to minimize the likelihood of self-disqualifications.

Appendix One--Wyoming

Community Anchor Institutions

In earlier submissions, the Community Anchor Institution (CAI) process was referred to in terms of a learning curve. This continues to be an appropriate metaphor. The mapping team continues to focus on data that will support and help inform policy makers and the SBI planning process.

Obtaining connectivity information for CAIs continues to be a significant challenge. In general we have found that one of the primary obstacles is identifying the correct person in the CAI organization that can provide the information we seek. In the first submission, the team gathered information on what data was available and what resources will be required to engage these categories of important institutions. In subsequent submissions we have focused our efforts on obtaining connectivity information for CAIs through direct outreach to the specific institutions as well as through central sources within the state or institution associations. In the current submission we had the following objectives:

Focus efforts on CAI that we do not have connectivity day for.
Identify the correct person in the organizations that can provide connectivity data for the institution.
For schools we focused on district level contacts.
Raise awareness of the broadband mapping program to organizations associated with the CAI categories with special emphasis to relevant local and, state government agencies.
Continued outreach to all CAIs inviting them to become engaged with the SBI program by participating in the online survey.
Update connectivity information based upon new survey information

CAI Philosophy

Our work with CAIs is guided by three principles.

First, CAIs are important stakeholders within the planning process. Our goal is to engage participants in regional planning that have strong ties into the CAI categories identified by NTIA. This has a direct benefit of engaging an established stakeholder community. It also allows broadband planning to tie into existing organizational and planning networks. In each of our states, key relationships with education, public safety, libraries, and economic development sectors are being identified and developed.

Second, we believe that CAIs will likely be one of the primary beneficiaries of targeted broadband funding. Our belief stems from the sense that many of the benefits of Broadband will extend from these community 'anchor points'. In other words, it isn't solely the existence of Broadband at a library that provides a benefit. It is people using applications that work only on a Broadband network to upgrade their skills (e.g., online training) and gain access to online content (e.g., job postings, goods and services), etc. The targeted use of a specific application--that can only take place with Broadband networks-- is what produces the priority benefit. Put another way, there seems to be a realization that things are less about pure connectivity (for the sake of connectivity) than about connectivity in terms of an application (for the sake of the benefit obtained through the application).

Third, we continue to use a rational and targeted approach to derive information. This means we will utilize our planning teams for as much field work as possible. This also means that a goal of our CAI process is not an exhaustive Census of anything that could be a CAI; rather, it is the discovery, inventory and integration of Broadband planning activities into those CAIs that stand to produce the greatest synergies with the SBI planning process.

The above implies two significant points. First, the team's goal is to document community anchor institution connectivity within a broader context of regional and statewide planning objectives. Second, if a particular category of CAI has an independent Broadband planning effort underway, we will encourage that organization to take the lead, and we will provide relevant expertise and support as warranted. For example, in one of our states, the public safety community was engaged in a mobile Broadband survey effort. We aligned our CAI data collection process with that effort and shared information and expertise (e.g., hosting a survey) to support their mission. In another state we attempted to glean connectivity information from a municipal government survey. There may be some downside to this collaborative approach in that we may have to work with data spanning different times or we may not have all of the location-specific information we need, but this does prevent the same user from receiving multiple inquiries.

Anchor Institution Survey

During the third submission period we designed and developed a simple on-line survey system called CAVS (Community Anchor Verification Survey). The intent of the survey was to both verify received connectivity information and garner additional connectivity information from CAIs. The link for the survey is housed on the Home Page of the State SBI website, thus providing the added opportunity for responding institutions to learn more about broadband activities in their state. The survey remains open between collection periods so that the Regional Planning Teams can update information as they engage with the community, and to allow responding institutions access to update their data as necessary.

Although we have found that reaching out to central contacts, for specific institution groups, is the most fruitful way of collecting connectivity data we find value in inviting individual anchor institutions to participate through means of a survey. In each round we reach out to CAIs using an adaptive approach that consists of: 1) Emailing individual institutions inviting them to participate in the on-line survey; and, 2) Follow-up phone calls, when appropriate, to the CAIs to obtain/confirm contact information and encourage participation in the survey. From our perspective, although this method is very time consuming and work intensive, it allows the opportunity to personally explain the objectives of the program and answer questions. It also provides an opportunity for the individual institutions to become engaged in the broadband planning process.

Anchor Institution Trends

To date we have focused our CAI attention on schools, libraries, and hospitals with respect to connectivity. We benefit from strong relationships throughout the education sector, (K-12 and Post-Secondary), and have found excellent resources with State librarians. In addition, we have formed organizational relationships with the major hospital associations and other key health organizations

within each state. Our goal with these relationships is to cull information from their planning process and partner with them on outreach. As in the prior submissions, we rely on public domain sources of information for the public safety-category. Collecting connectivity data for this group continues to be one of our most significant challenges. We continue to look for ways to reduce the size of this category and connectivity information specific to root nodes of the public safety network--such as County Emergency Operation Centers.[28] Through our interaction with this sector we have learned that there are real security concerns about having information about their network connections being made available on a public site. In many instances this prevents them from fully participating in the survey.

Because we have a wide ranging population of CAIs in our data set we have a variety of Broadband services that don't always fit NOFA parameters. Services like PRI or T1 are classified into "other copper," We also had difficulty obtaining both the upstream and downstream channel capacities. In most instances, when it was logical to do so, we made the speeds symmetrical, but this is an assumption on our part. If a site records bandwidth across several services (eg. video and data), we record the total bandwidth to give a picture of available site bandwidth. We are also working to standardize our response to NTIA in circumstances where an entity shares a Broadband connection among a campus. In this case we use the total campus bandwidth and use the primary campus Internet connection. In this regard, we have also received strong comments that for many school districts the problem is less about connectivity to a central node then connectivity from the central node out to served buildings.

As a final verification step, we attempt to screen the CAI data for duplicate values. Because many CAI are closely clustered together and may even share the same building (physical address) we perform the de-duplication manually.

[28] Within the public safety category, it is also very difficult to derive precise locations as many CAI are addressed to PO boxes . This is further complicated due to the many Volunteer Fire Departments used in Rural Communities which often do not have a physical location.

Appendix Two

Data Collection Challenges

This section summarizes some of the challenges we have experienced with data collection and processing. The team believes it is important to categorize these challenges as they help inform the geoprocessing and verification methods used. It is also our hope that some of the more global issues can be discussed and decided within the Grantee community.

We begin with several global issues and then continue toward more granular challenges.

Global Data Collection Issues

Maximum Advertised Speed is Not Reported Consistently

As has been discussed in webinars and also within the context of NTIA data assessments, much reported speed information continues to be reported at the market level (MSA/RSA) and then uniformly pushed down to the Census blocks. This has a tendency to create a problem with NTIA speed tripwires since the technology is reported by block but the maximum advertised speed is reported at a regional level.

This challenge gets further amplified at a block level when comparing to a third party data provider. It can create a mismatch between third party data generated at an area larger than block level versus block level generated speed and vice versa. To minimize the potential confusion, it might be helpful to be able to provide a flag at the submitted record level which indicates the geographic basis by which the Maximum Advertised Speed is reported.

Census Block and Road Standards are not clear

There seem to be several methods by which providers are calculating the Census block area. So the distinction at 2.00 square miles can be uniform, it would be ideal to articulate an operational area calculation definition.

Providers Not Wishing for Block Level Aggregation of Their Data

For providers who submit address point data, we do minimal additional processing. Our main test is to ensure that points are contained within 1 mile of exchange boundaries; the only other processing was normalization into NTIA formats.

Broadband providers not Meeting the NOFA "provider" Definition

Comments on PBWorks appear to reflect a concern among a number of grantees about what a Broadband provider is--and how that definition impacts mapping.

If the 7-10 day provisioning rule is to be strictly enforced, it could seem to eliminate a number of prominent Broadband providers[29]. Further, the need for clarification around a facilities-based provider,

[29] By email ***REDACT*** informed us they could not provision in 7-10 days, but they also supply information on qualified locations to the address point level. Therefore, we draw a distinction between an incumbent provider owning the facility--which terminates at a customer premise--who cannot turn up service at a qualified location, versus a provider not reporting any specific qualified locations in which they cannot turnup service in the 7-10 day

versus the reseller, has injected even more uncertainty. Right now we are unclear on how strictly to interpret either of these important distinctions, but we are concerned that we are beginning to create an NTIA exclusion criterion that is going to confuse downstream consumers of the data.

Given mergers and acquisitions in the CLEC space we are noticing a drop off in participation in this program by several national CLECs. We hope this is an artifact of the mergers and resource constraints rather than a long term trend.

Again, we do not want to exclude a service provider, but we believe there needs to be further clarification around the "7-10 day rule," the definition of a "reseller," and better interpretation of facility-based providers, versus equipping UNEs, SpA or leased lines.

We have used the provider Type of "Other" to classify a number of providers who offer Broadband services, but we do not offer them in a manner consistent with Technical Appendix A definitions.

To What Extent Should We Begin "Classifying" the Data and Maps?

The question immediately preceding gets to the intent of a Broadband provider. This question gets to the intent of the Data and Maps.

Earlier in this document we discussed the question of what type of bias we should introduce to our online map messaging. In an online environment, do we want to more likely create an overstatement of coverage for a provider than an understatement? In other words, is the larger problem allowing a consumer to self-disqualify, versus calling a number of neighboring providers? There is a related issue to this. Clearly in our maps there is a lot of scatter in data that we believe should be more continuous. These are the islands of coverage from an incumbent provider[30]. There are a number of processes that could be put in place to deal with this type of scatter, but without more information from the service provider-- essentially the last mile facilities-- it will be difficult to perform this clean up in an informed manner. On the one hand, we can aesthetically clean the maps up and reduce the scatter, but we have little sub-block engineering information upon which to make this decision. Right now our preference is to put out a somewhat aesthetically messier deliverable and work with providers to get better information to clarify their submission. If that isn't forthcoming, we are limited in what can be done given the lack of facility level information. In summary this yields two questions

In our online maps should we error on overstating coverage to prevent consumer self-disqualification?
In our online maps should we work to clean up a lot of the scatter that we see without having facility-based evidence from which to remove it?

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window. In the first case we have a sense of where service can be offered and verified. In the second, we have no evidence that a service could exist there until a specific location becomes a customer.

[30] For a provider who sells opportunistically (not within a franchise area) it becomes even more problematic to classify their coverage because the points are more related to the type of consumer purchasing the service than a bounded offering. In a matter of speaking, the ProviderType is more determined by the technology and/or location than a type of business. The core intent of the NOFA and our grant application was centered around the 7-10 day providers but we believe maintaining information on provider Type "Other" and "Reseller" is important to assist in validation and market segment analysis as resources are available.

As we examine results from third party data assessments, it appears that this scatter is something that is also problematic with the assessment results. It also appears to be evident that different third party data sources treat water areas differently. When we are developing data based upon Wireline facilities, we exclude water blocks. We do not filter out water blocks from provider submitted data. We are unsure if there is or should be a standard in how water covered blocks are treated for Wireline broadband providers.

Community Anchor Institution Surveys

Over time the base of participation in CAI surveys has broadened. Our teams are interacting with more organizations interested in broadband planning. This is a benefit because it helps integrate the importance of Broadband mapping, planning and capacity building within their organizational framework. But it also begins to create challenges in data collection. There are two noticeable trends in this area.

First, CAIs are organizationally diverse. For a school, you expect to have a centralized entity that can answer and support questions about Broadband services. For a rural, volunteer fire department answering questions about broadband may go to the Chief. The way that he/she answers about Broadband is probably specific to her experience and context. The implication is two-fold. First saying that some percentage of CAIs in a state have access to broadband can be misleading because the formality of a school or government building is much different than the formality of a volunteer fire department. Second, that volunteer fire department may get broadband via a 3G mobile hotpsot when they need it…but the presence of *this* type of broadband is a very different thing than the presence of a responder who has mobile LTE broadband.

Second, technical knowledge of the survey respondent differs within each organization. This complicates our data collection. It is not uncommon for someone to say yes we have Broadband, I just don't know how we get it or how fast this is. So in response we report they are broadband served but unknown speed or technology. This doesn't mean they haven't been surveyed, it just means the response was unknown. As there are now a large number of people collecting this data, it would be helpful to have some consistent national business rules from which we can answer questions about the meaning of any particular data element. As an example, when should "no" be used versus when should "unknown "be used. In other words, what is the standard for the difference between never made contact with the CAI versus a respondent didn't know/couldn't answer. We have guidelines internally but are unsure if this is consistent across states.

Granular Data Collection Issues

Non-Uniform Submission Standards

It is clear among providers that there isn't a consistent method used to derive Broadband coverage. Some providers appear to be use a geocoding approach and then point in polygon or point on segment process. Others may be using GPS locations. In some cases, it is difficult to infer what reference data was used to georeference plant (is it the carrier's roadbase?). This leads to uncertainty regarding the input data scale or accuracy relative to other base layers. Although we may be trading off absolute

accuracy, our standard has been to conflate submitted data to TIGER 2010 Blocks and TIGER 2010 roads. We perform our verification against this conflated data product.

Temporal

We are unsure of how well the data are temporally consistent. Some providers gave us their best effort to control to the requested survey date. We note that some providers were clear that the submission was as of extract date without any way to move back in time. They have no means to control for time and cannot provide any audit support beyond when the data are released to us. Some data-especially loop qualification data-may change from day to day. It will be very difficult to clarify why something was changed from a given point in time.

Perceived Inaccuracy with Respect to Internal Standards

The NOFA is clear on submitting a list of Blocks in which a provider delivers Broadband service. This is a different objective than perfectly reflecting service territories. If a firm's accuracy standard is a reflection of their service area, then the data created under the NOFA will not meet their perception of accuracy. This leads to two other issues: First, using Census Blocks rather than serving area may overstate or understate a particular provider's Broadband serving area. This was a significant concern of ***REDACT*** who specifically required us to submit only address-level qualification data. The second issue this brings up is how or if, there should be some standard on how much of a Census Block needs to be covered to call it covered.

Confidentiality

Several providers have noted concerns with CPNI-related issues and have stated this as a reason for non-participation. We have also heard expressions of comparable concern regarding identifiable responses to Anchor Institution information.

Unclear on Definitions

As discussed earlier, several providers claimed confusion on several key terms involved in Middle Mile. We note a consistent stream of questions around the interpretation of Maximum Advertised Speed. Some providers understand this to be the most common speed package bought within the mass market, while others view this as a speed that can be purchased for an additional cost above a mass market offering (e.g. a Turbo option for an additional fee per month). Others interpret this as the fastest speed that is available for that particular location--in terms of xDSL, a structure qualified speed, for example.

Perception of Data Use

There seems to be some hesitancy releasing speed information because no one is sure of how the information will be used, or what the speed is intended to reflect. A number of providers have verbally indicated that typical speed will be about (on average) 80% of purchased speed due to overhead. But there are many other factors (such as a user's home network) that influence speeds measures. Providers are concerned about introducing statistics without a clear understanding of how those statistics are derived and will then be used. Also, as advertised speed is pushed down to a block level, we sense more trepidation to report speed values. This quickly begins to touch on parity across network types (why is wireline down at the block when wireless is half the state, etc.). Finally we note a

significant increase in speed values reported to us. This may be due to network upgrades or competitive concerns to match the theoretical network speed.

Location Uncertainty In Source Data

Within this document we have noted concerns about the impact of source data accuracy. Our geoprocessing methodology provided what we believe is a relatively conservative tolerance to account for the scale issue in the source data, but we are unsure of how this may impact downstream users. Clearly, it also impacts the verification process because we can't attempt to verify received data beyond a scale at which it was developed.

Covered Segment Process

Deriving Broadband covered segments in Census Blocks greater than 2 square miles has proved to be a challenge. Moving from a NOFA specified tabular deliverable to a requested geographic deliverable also increases the complexity of the effort.

Record Level Metadata

It would be helpful to have one or two additional fields in each feature class transmitted to NTIA. One User Defined field could be helpful as an expression of record level confidence. The second field could be used as a Key between the transfer geodatabase and our systems. Ideally, both fields could be large text fields (50 char) so the Grantee can use them to express a variety of attributes.

Miscellaneous Data Collection Notes

We note the following important observations regarding our data submission:

There are Middle Mile plant records for providers who are not present in the Census block, segment or wireless area feature classes. This is due to classification as non-NOFA Broadband providers.
In some cases, we have trimmed wireless coverage estimates to honor state boundaries.
We believe some providers are trimming their coverage to honor license area boundaries.
Where a provider submitted Middle Mile points out of state, we are no longer passing those points to NTIA as they fail the validation script.
In tables with mandatory Street and Zip5 attributes (Service Address), if the value is unavailable we fill the default value.
As before there remain some differences between the Data Model, Data Model Default Values and the Python Validation Script.
We have a significant amount of VDSL, ADSL 2 and ADSL 2+ coverage categorized into the xADSL category. This introduces large variance in speed availability as some providers are using VDSL, shortened loops and/or pair bonding to increase speed to levels nearly 30 Mbps.
We note a few providers who have speeds seemingly inconsistent with their technology of transmission. This is either very low speeds with optical fiber, or very high speeds with non DOCSIS 3.0 systems. We have verified on provider websites that the reported speeds are available in the area but these speeds will fall out of the NTIA frequency table analysis.
We have a small number of providers who serve an area with both a residential and business speed tier. In cases where we cannot distinguish which speed tier offering to use, we use the higher of the speed tiers.

Per NTIA request we have modified the manner in which we handle Wireless coverage polygons. If a Provider submits a single geometry but specifies multiple spectrum codes in use in that polygon, we duplicate the polygon for each spectrum code. In other words the geographic object is identical but the attribute data for the object is unique.

In point level data submissions (Service Address and CAI) we note points that are spatially coincident. With respect to Service Address points our thought is these represent multi-unit dwellings or businesses but we don't have enough address detail to determine if these are multi-unit structures or duplicated customers. Because we cannot determine the reason for the duplication we leave spatially coincident records in our submission. We also leave in our CAI submission points which may be the same physical structure but have slight variations in addressing.

In point level middle mile data, we are finding a variance in the quality of the geocoded longitude and latitude returned. Given the data received we are unsure if this is an issue where the plant address is difficult to geocode or if the longitude and latitude provided to us is different than what would be returned in geocoding.

For Block and Segment level data which we produce based upon provider facility or service area boundaries, we remove Census blocks which are entirely water covered. This results in a drop of Census block counts for a number of providers.

Appendix Three

This appendix contains the confidentiality clarification supplied in a series of emails between CostQuest and NTIA.

Feature Class	*Metadata*	*NOFA Confidential?*	*Online Map*	*Public Disclosure*	*Exemption*
Last Mile	Constraints on accessing and using the data	Yes	No	No	None
	Access constraints: None				
	Use constraints:				
	This data is confidential as defined in the NOFA.				
Middle Mile	Constraints on accessing and using the data	Yes	No	No	None
	Access constraints: None				
	Use constraints:				
	This data is confidential as defined in the NOFA.				
Service Address	Constraints on accessing and using the data	No	No	Yes	
	Access constraints: None				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
CAI	Constraints on accessing and using the data	No	Yes	Yes	NO attributes on any record in this feature class are considered confidential
	Access constraints: None				
	Use constraints:				
	There are no restrictions on distribution of				

	the data by users.				
Census Block	Constraints on accessing and using the data	No	Yes	Yes	NO attributes on any record in this feature class are considered confidential
	Access constraints: None				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
Service Overview	Constraints on accessing and using the data	No	Yes	Yes	The only provider who may not show up on this table is a provider who has provided only confidential data (last mile, Middle Mile, address point with provider name)
	Access constraints: None				
	Use constraints:				

	There are no restrictions on distribution of the data by users.				
Road Segment	Constraints on accessing and using the data	No	Yes	Yes	NO attributes on any record in this feature class are considered confidential
	Access constraints: None.				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
Wireless	Constraints on accessing and using the data	No	Yes	Yes	NO attributes on any record in this feature class are considered confidential
	Access constraints: None				
	Use constraints:				
	There are no restrictions on distribution of the data by users				

Appendix Four-Wyoming

This appendix details our analysis of the potential and actual broadband provider market. We include both our internal tracking description document and then our categorization for each provider. As this extract was made prior to final submission, there may be differences between provider categorization and the attributes on the day of submission to NTIA.

Provider Categorization

Provider Type and Status Definitions

The Provider Type is based upon categories provided by NTIA, while the Provider Status is based upon categories developed internally for tracking purposes. It should be noted that the Provider Status discussed here relates to the provider's overall status within the program.

Provider Type Codes and Definitions:

NTIA code	Code	Name	Definition
1	P	Provider	This code applies to all confirmed providers of broadband service per the SBI program NOFA. A provider is given a "P" designation if we have determined that the company does indeed exist and appears to be providing broadband services.
2	R	Reseller	This code applies to all broadband entities that have been confirmed as pure resellers – meaning they do not own their own facility/equipment and simply resell services under their own brand name or the brand name of an actual Provider.
3	O	Other	The code applies to entities who were originally placed on the SBI provider list, but whose status is still in question or has been determined to be non-NOFA compliant.
	N/A	Not applicable	This code applies to entities who appeared on the original state provider list or a third party list (such as the FCC 477, American

4			Roamer, or Warren Media lists) but who have been confirmed as NOT providing broadband services.
	X	Inactive	This code applies to entities that may have appeared on an early provider list but whose identity and existence we subsequently have been unable to verify. This code may also apply to providers who have since been acquired or simple gone out of business and for which no FRN appears on the FCC list – These no longer need to be reported to NTIA. This is an INTERNAL category used to remove entities completely from the list of entities submitted to NTIA.

Once the proper Provider Type has been assigned to an entity, and overall Provider Status must be established. The Provider Status codes are specific to the Provider Types, and are not interchangeable. The following table lists the status codes associated with each Provider Type.

Provider Status Definitions

Provider Type Code	Provider Status Code	Name	Definition
P	D	Declined	A provider is given a Status of "D" if they have officially stated verbally or in writing that they will not participate in the SBI program.
	P	Participating	A provider is considered to be "Participating" if they have submitted USABLE data in at least one data submission round. The data does not need to be 100% complete for a provider to be assigned a "P" code – they simply have to have provided a level of data that is sufficient to submit to NTIA.
	NR	Non Responsive	A provider is considered "Non Responsive" if they have either failed to respond to any of our correspondence, or they have submitted insufficient data that makes inclusion of their data in the NTIA submission impossible.
	V	Submitted under other ID	A provider whose data is submitted under another Provider ID, but is operating under their own FRN.
	E	Estimated	A provider is marked as "Estimated" if they have not submitted usable data, and would otherwise be considered non-responsive, BUT for whom we are able to submit data by using estimation techniques and/or third party sources. This designation applies only to providers whose data is 100% estimated.
R	R	Reseller	"R" is the only status code for Resellers and it simply reconfirms their status as a reseller –data may not be submitted but name of provider is included in NTIA data package.
O	U	Unknown	The status of Unknown is assigned to an entity whose name has appeared on a list (or been submitted as a new possible provider) and is currently under investigation. It has not been determined yet if this entity is indeed offering broadband services or not.
	NC	Non-Compliant	This status is assigned to entities who appear to be in the broadband industry, but who do not meet the formal definition of a BB provider under NOFA requirements. Examples may be entities who cannot provision service within 7-10 days.

	P	Participating	These are providers who do not meet the formal definition of a BB provider under NOFA requirements, but are participating in the program and submitting data.
	NP	Not a Provider	This status applies to entities who may appear on a third partly list of valid providers, but who have been proven to either no longer exist, or simply no longer provides broadband services.
N/A			No status codes associated with this Provider Type
X			

Provider Disposition

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
587	WY	TCT West, Inc.	TCT West, Inc.	N/A	P	P
588	WY	All West Communications	All West Communications	All West Wireless	P	P
589	WY	Century Tel/Embarq	Embarq Corporation		P	V
590	WY	Dubois Telephone Exchange, Inc.	DTE	Range Telephone Cooperative, Inc.	P	P
591	WY	Qwest Communications Company, LLC	CenturyLink	Qwest Communications International, Inc.	O	NC
592	WY	RT Communications, Inc.	RT Communications, Inc.	Range Telephone Cooperative, Inc.	P	P
593	WY	Silver Star Telephone Company, Inc.	Silver Star Communications	Silver Star Telephone	P	P
594	WY	Tri County Telephone Association, Inc.	Tri County Telephone Association, Inc.	Tri County Telephone Association, Inc.	P	P
595	WY	Union Telephone	Union Telephone	Union Telephone Company	P	P
596	WY	AT&T Mobility LLC	AT&T Mobility LLC	AT&T Mobility	P	P
597	WY	All West Communications, Inc.	All West		P	V
598	WY	B & C Cablevision	B & C Cablevision		N/A	NP
599	WY	CSC Holdings, Inc.	Bresnan	CSC Holdings, LLC	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
			Communications			
600	WY	Champion Broadband	Champion Broadband	N/A	N/A	NP
601	WY	Cowley Telecable	Cowley Telecable		X	
602	WY	Green River Cable (SEE SWEETWATER)	Green River Cable	Green River Cable TV	P	V
603	WY	Tongue River Cable TV, Inc.	Tongue River Cable TV, Inc.	Tongue River Communications	P	P
604	WY	Viking Broadband	Vicking Broadband		N/A	NP
605	WY	Byron Cable	Byron Cable		N/A	NP
606	WY	Comcast Spotlight	Comcast		X	
607	WY	James Cable	Mediastream	CommuniComm Services	P	P
608	WY	Klip, LLC	KLIP (Bulldog Cable?)		N/A	NP
609	WY	Sweetwater Cable Television Company, Inc	Sweetwater Cable TV	Sweetwater Television Company, Inc.	P	P
610	WY	Wyoming PBS	Wyoming PBS		N/A	NP
611	WY	Allred Radio (see Notes - SVWI.net)	Allred Radio (see Notes - SVWI.net)		N/A	NP
612	WY	AllureTech/CoffeyNet	AllureTech/CoffeyNet	AllureTech/Coffeynet	P	P
613	WY	AviCom-KDIS	KDIS.Net		P	NR
615	WY	TCT West, Inc.	DirectAirNet		P	V
616	WY	Extreme Highspeed	Extreme Highspeed		N/A	NP
617	WY	Fascinations	Fascinations	N/A	P	P
619	WY	Jackson Hole Compunet	Jackson Hole Compunet		P	D
620	WY	KDIS.Net (dup see PN 613)	KDIS.Net (dup see PN 613)		X	
621	WY	LARIAT	LARIAT		P	D
622	WY	Lone Tree/Wyoming Network	Lone Tree/Wyoming Network		R	R
623	WY	Microserv Telecomputing	Microserv Telecomputing		P	NR
625	WY	Sundance Wireless	Sundance Wireless		P	NR
627	WY	Visionary Communications	Visionary Communications,	N/A	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
			Inc.			
628	WY	Inventive Wireless of Nebraska, LLC	Vistabeam	Inventive Wireless of Nebraska, LLC	P	P
629	WY	Wyoming Internet Resources	Wyoming Internet Resources		P	D
630	WY	Wyoming Wireless Internet	Wyoming Wireless Internet		P	NR
631	WY	Wyoming.com	Wyoming.com	N/A	P	P
636	WY	Range Telephone Cooperative Inc	Range Telephone Cooperative Inc	Range Telephone Cooperative, Inc.	P	P
637	WY	Surf Communications, Inc.	Fiberpipe Internet	N/A	P	P
641	WY	Columbine Telephone Company, Inc.	Silver Star Communications	Silver Star Telephone	P	P
642	WY	Gold Star Communications LLC	Silver Star Wireless	Silver Star Telephone	P	P
652	WY	Sprint Nextel Corporation	Sprint	Sprint Nextel Corporation	P	P
656	WY	Megapath, Inc.	Megapath	N/A	N/A	NP
657	WY	DSLnet Communications, LLC	DSLnet Communications, LLC	Megapath, Inc.	N/A	NP
659	WY	Level 3 Communications, LLC	Level 3 Communications, LLC	Level 3 Communications, LLC	P	P
663	WY	CenturyTel, Inc.	CenturyLink	CenturyTel, Inc.	P	P
664	WY	Project Telephone	Nemont	Nemont Telephone Cooperative, Inc.	P	P
668	WY	ViaSat, Inc.	ViaSat Communications	WildBlue Communications, Inc.	P	P
670	WY	Chugwater Telephone	Chugwater Telephone	Chugwater Telephone Company	P	P
676	WY	New Edge Network, Inc.	New Edge Networks	New Edge Holding Company	O	NC
680	WY	360 Networks (USA) Inc.	360 Networks (USA) Inc.	Zayo Group, LLC	O	NC
681	WY	Advanced Communication	ACT	Range Telephone Cooperative, Inc.	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
		Technology				
685	WY	WERCS Communications, Inc.	Mountain West Telephone	WERCS Communications Inc.	P	P
688	WY	JAB Broadband - SKYBEAM	JAB Broadband - SKYBEAM	JAB Wireless, Inc.	P	P
691	WY	OrbitCom, Inc.	OrbitCom, Inc.	OrbitCom, Inc	O	NC
710	WY	Windjammer Cable	Windjammer Cable	Windjammer Communications LLC	N/A	NP
712	WY	Verizon Wireless	Verizon Wireless	Verizon Communications Inc.	P	P
721	WY	DigitalBridge Communications	Bridgemaxx	DigitalBridge Communications Corp.	N/A	NP
730	WY	WYrlessInternet	WYrlessInternet	N/A	N/A	NP
739	WY	PAETEC Holding Corp	McLeodUSA Telecommunications Services, Inc.		N/A	NP
741	WY	Myvocom, Inc.	Myvocom		P	NR
762	WY	Wyoming.com	Wyoming.com	N/A	P	P
763	WY	Collins Communications, Inc.	Collins Communications, Inc.	N/A	P	E
770	WY	Uintah Basin Electronic Telecom	STRATA Networks	UBTA-UBET Communications	P	P
771	WY	T-Mobile USA, Inc.	T-Mobile	T-Mobile USA	P	P
774	WY	Millhouse Electronics Inc.	Millhouse Electronics Inc.	N/A	P	P
824	WY	Action Communications, Inc.	Action Communications Inc.	Action Communications, Inc.	R	R
825	WY	Kudera Inc.	Cowboy Communications	Cowboy Communications	N/A	NP
826	WY	Greenfly Networks, Inc	Clearfly	Greenfly Networks, Inc.	R	R
827	WY	HNS License Sub, LLC	Hughes Network Systems	Hughes Communications, Inc.	P	P
828	WY	StarBand Communications Inc.	StarBand Communications Inc.	StarBand Communications Inc.	P	P
834	WY	Windbreak Cable	Windbreak Cable	WinDBreak Cable	P	P
840	WY	Skycasters, LLC	Skycasters, LLC		P	P
853	WY	Access Spectrum	Access Spectrum	Access Spectrum	N/A	NP

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
864	WY	Cavalier Wireless LLC	Cavalier Wireless LLC	Cavalier Wireless LLC	N/A	NP
871	WY	Commnet Wireless	Commnet Wireless	Commnet Wireless	N/A	NP
873	WY	Convey Communications	Convey Communications	Convey Communications	N/A	NP
882	WY	GW Wireless, Inc.	Golden West Technologies	Golden West Technologies	N/A	NP
883	WY	Great American Broadband Inc	Great American Broadband Inc	Great American Broadband, Inc.	N/A	NP
886	WY	Hemingford Cooperative Telephone Company	Hemingford Cooperative Telephone Company	Hemingford Cooperative Telephone Company	R	R
892	WY	Leap Wireless	Leap Wireless	Leap Wireless	N/A	NP
893	WY	Manti Telephone Company	Manti Telephone Company	Manti Telephone Company	N/A	NP
895	WY	Medicine Bow Cable	Medicine Bow Cable	Medicine Bow Cable	N/A	NP
897	WY	Metro PCS	Metro PCS	Metro PCS	N/A	NP
898	WY	MTPCS License Co., LLC	Cellular One	MTPCS LLC	O	U
903	WY	Optimum	Optimum	Optimum	P	V
904	WY	Personal Communications Services, Inc.	Personal Communications Services, Inc.	Personal Communications Services, Inc.	O	U
910	WY	Qualcomm	MediaFLO	Qualcomm	N/A	NP
918	WY	SpectrumCo	SpectrumCo	SpectrumCo	N/A	NP
919	WY	Syringa Wireless	Syringa Wireless	Syringa Wireless	N/A	NP
929	WY	Western Communications Inc.	Western Communications Inc.	Western Communications Inc.	N/A	NP
934	WY	Zayo Group, LLC (FiberNet)	Zayo Enterprise Networks	Zayo Group, LLC	O	NC
944	WY	Wind River Internet	Wind River Internet		P	NR
945	WY	NGL Connection	NGL Connection		P	P
950	WY	Union Telephone Company	Union Wireless		P	P
952	WY	H.J. L.L.C.	Big Dog High Speed Internet		P	P
130001	WY	AT&T Inc.	New Cingular Wireless Services,		P	V

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
			Inc.			
130002	WY	Atlantis Holdings LLC	Alltel Corporation		P	V
130004	WY	Global Crossing North America, Inc.	Global Crossing Telecommunications, Inc		R	R
130009	WY	Level 3 Communications, LLC	Broadwing Communications, LLC		P	V
130011	WY	NE Colorado Cellular, Inc.	Viaero		N/A	NP
130012	WY	NE Colorado Cellular, Inc.	Cellular ONE of Northeast Colorado	NE Colorado Cellular	N/A	NP
130013	WY	Star Valley Wireless (SVWI)	Star Valley Wireless (SVWI)		P	NR
130015	WY	TCT West, Inc.	Lovell Cable TV		N/A	NP
130016	WY	Verizon Business Global LLC	Verizon Business		O	NC
130017	WY	Wamsutter	Wamsutter.us		P	NR
130018	WY	Wyoming 1 - Park L.P.	Wyoming 1 - Park L.P.		R	R
130020	WY	All West Communications, Inc.	Wyoming, Inc.		P	V
130021	WY	CenturyTel, Inc.	CenturyLink		P	V
130022	WY	AT&T Inc.	AT&T MOBILITY CORPORATION		P	V
130023	WY	Cams Cable	Cams		X	
130031	WY	Dish Network	Dish Network	Dish Network	R	R
130044	WY	Speed Connect	Speed Connect	N/A	N/A	NP
130049	WY	Reallinx, Inc.	Reallinx, Inc.	Reallinx, Inc.	R	R
130050	WY	Earthlink	Earthlink	EarthLink	O	NC
130051	WY	Liberty-Bell, LLC	Liberty-Bell, LLC	Liberty-Bell, LLC	R	R