



DATA DEVELOPMENT & VALIDATION METHODOLOGIES

WHITE PAPER

State of Louisiana
State Broadband Initiative (SBI)
Broadband Mapping Project

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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:

- 155 Total Investigated ISPs
- 72 Total Confirmed Broadband Service Providers (Unique Provider/DBA Combinations)
- 53 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.

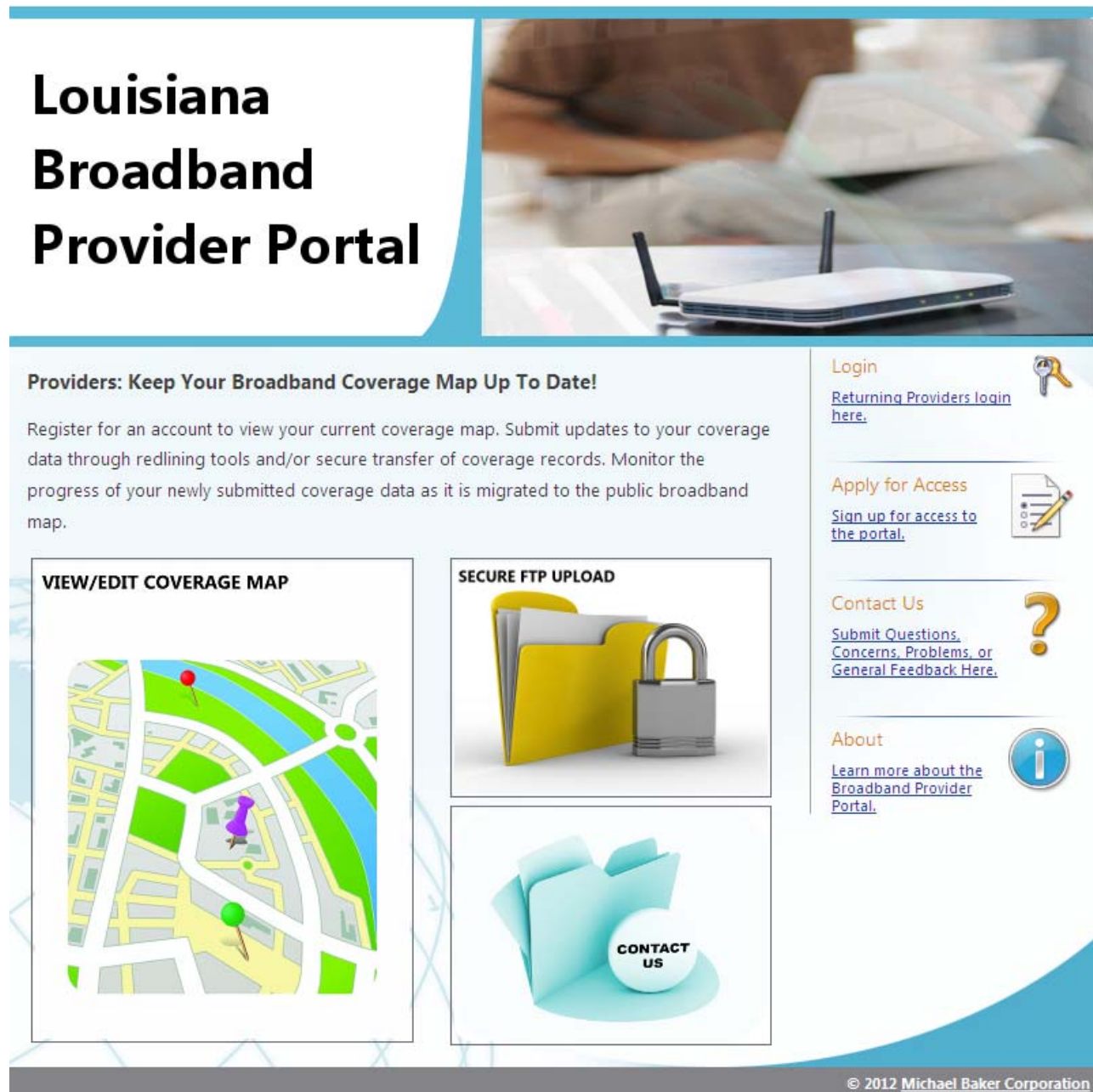


Figure 1 Provider Data Update Webportal Entry Page

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.

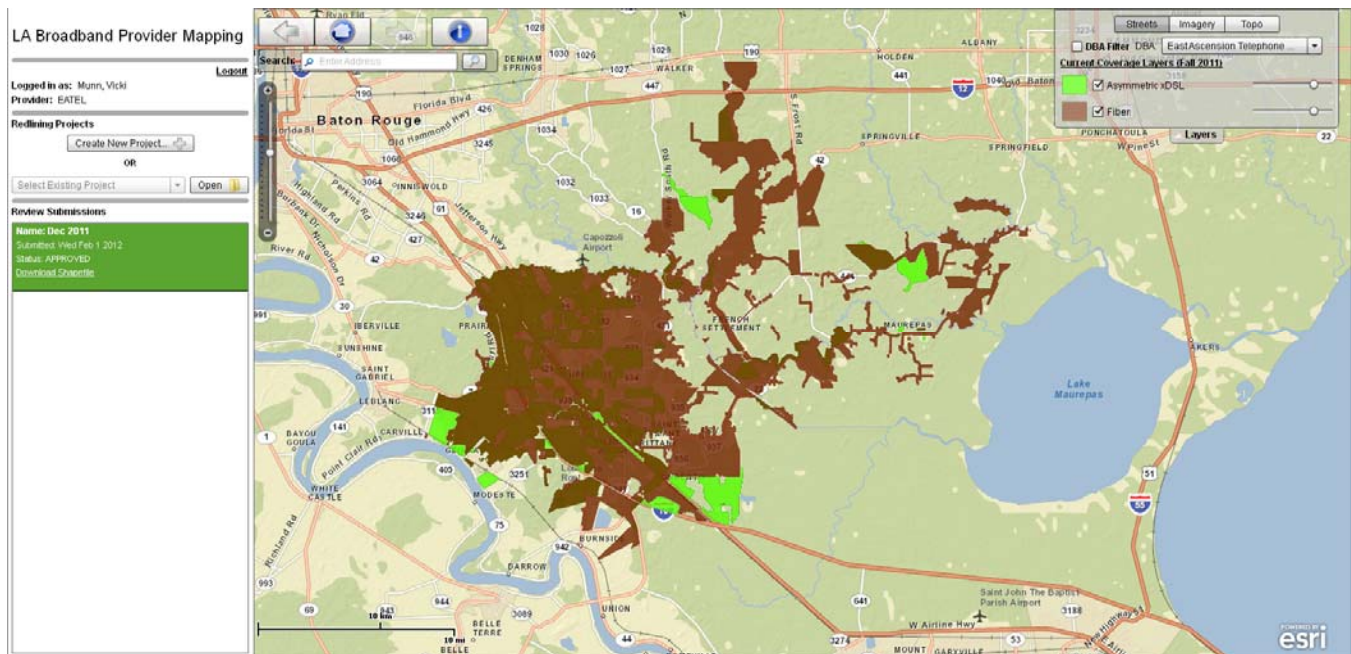
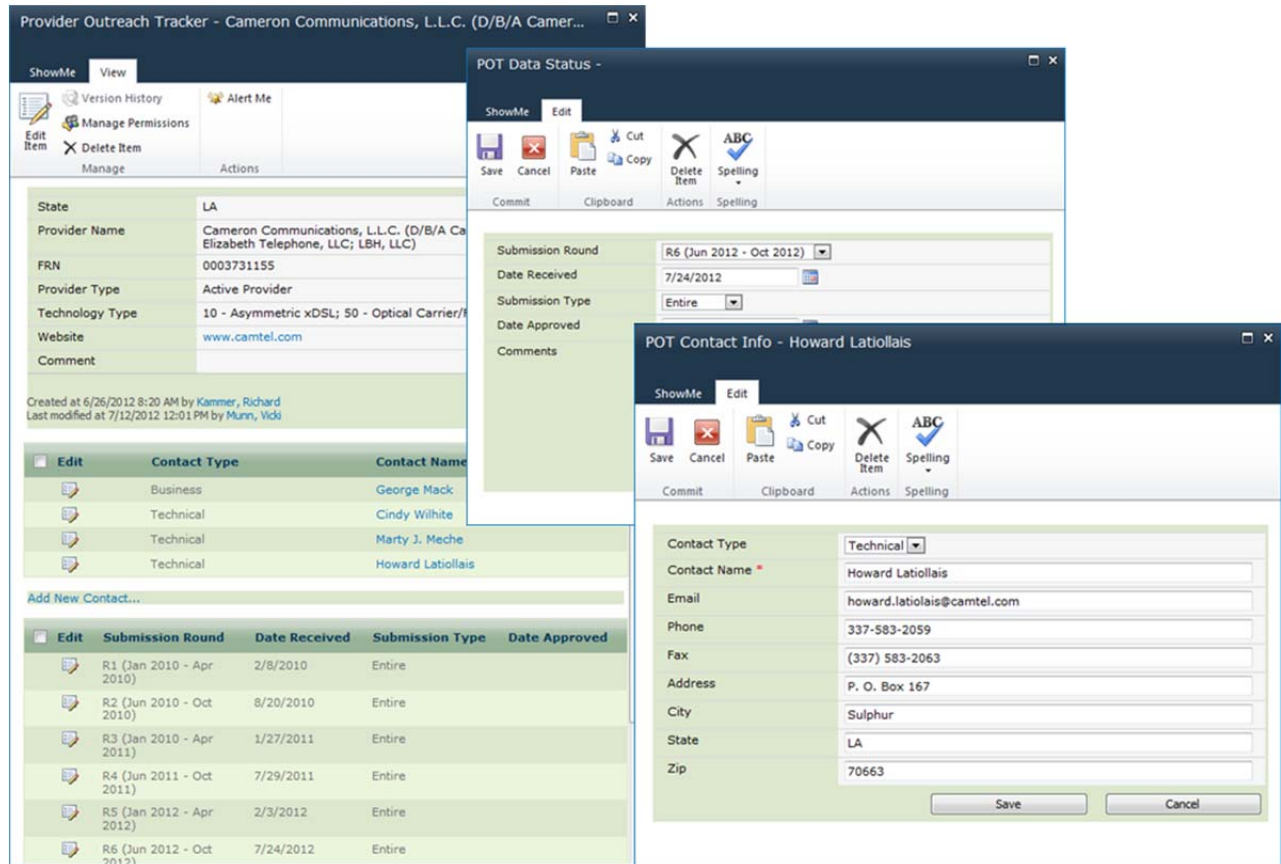


Figure 2 Provider Data Update Webportal – View/Edit Coverage Map Environment

Broadband Outreach Tracker Application

The Tracker application (



The screenshot displays three overlapping windows from the Broadband Outreach Tracker Application:

- Provider Outreach Tracker - Cameron Communications, L.L.C. (D/B/A Camer...)**: This window shows a form for provider details and a table of submission rounds.

| State | LA |
|-----------------|-----------------------------------------------------------------------------------|
| Provider Name | Cameron Communications, L.L.C. (D/B/A Cameron Elizabeth Telephone, LLC; LBH, LLC) |
| FRN | 0003731155 |
| Provider Type | Active Provider |
| Technology Type | 10 - Asymmetric xDSL; 50 - Optical Carrier/... |
| Website | www.camtel.com |
| Comment | |

Created at 6/26/2012 8:20 AM by Kammer, Richard
Last modified at 7/12/2012 12:01 PM by Munn, Vicki

| Contact Type | Contact Name |
|--------------|-------------------|
| Business | George Mack |
| Technical | Cindy Wilhite |
| Technical | Marty J. Meche |
| Technical | Howard Latiollais |

Add New Contact...

| Submission Round | Date Received | Submission Type | Date Approved |
|--------------------------|---------------|-----------------|---------------|
| R1 (Jan 2010 - Apr 2010) | 2/8/2010 | Entire | |
| R2 (Jun 2010 - Oct 2010) | 8/20/2010 | Entire | |
| R3 (Jan 2011 - Apr 2011) | 1/27/2011 | Entire | |
| R4 (Jun 2011 - Oct 2011) | 7/29/2011 | Entire | |
| R5 (Jan 2012 - Apr 2012) | 2/3/2012 | Entire | |
| R6 (Jun 2012 - Oct 2012) | 7/24/2012 | Entire | |
- POT Data Status -**: This window shows a form for submission details.

| Submission Round | R6 (Jun 2012 - Oct 2012) |
|------------------|--------------------------|
| Date Received | 7/24/2012 |
| Submission Type | Entire |
| Date Approved | |
| Comments | |
- POT Contact Info - Howard Latiollais**: This window shows a form for contact details.

| Contact Type | Technical |
|--------------|------------------------------|
| Contact Name | Howard Latiollais |
| Email | howard.latiollais@camtel.com |
| Phone | 337-583-2059 |
| Fax | (337) 583-2063 |
| Address | P. O. Box 167 |
| City | Sulphur |
| State | LA |
| Zip | 70663 |

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.

The screenshot displays three overlapping windows from the Broadband Outreach Tracker application:

- Provider Outreach Tracker - Cameron Communications, L.L.C. (D/B/A Camer...)**: This window shows a form for provider details.

| | |
|-----------------|------------------------------------------------------------------------------------|
| State | LA |
| Provider Name | Cameron Communications, L.L.C. (D/B/A Camer... Elizabeth Telephone, LLC; LBH, LLC) |
| FRN | 0003731155 |
| Provider Type | Active Provider |
| Technology Type | 10 - Asymmetric xDSL; 50 - Optical Carrier/... |
| Website | www.camtel.com |
| Comment | |

Created at 6/26/2012 8:20 AM by Kammer, Richard
Last modified at 7/12/2012 12:01 PM by Munn, Vicki

| Edit | Contact Type | Contact Name |
|------|--------------|-------------------|
| | Business | George Mack |
| | Technical | Cindy Wilhite |
| | Technical | Marty J. Meche |
| | Technical | Howard Latiollais |

Below the table is a section for submission history with columns: Edit, Submission Round, Date Received, Submission Type, Date Approved.
- POT Data Status -**: This window shows submission details.

| | |
|------------------|--------------------------|
| Submission Round | R6 (Jun 2012 - Oct 2012) |
| Date Received | 7/24/2012 |
| Submission Type | Entire |
| Date Approved | |
| Comments | |
- POT Contact Info - Howard Latiollais**: This window shows contact details.

| | |
|----------------|------------------------------|
| Contact Type | Technical |
| Contact Name * | Howard Latiollais |
| Email | howard.latiollais@camtel.com |
| Phone | 337-583-2059 |
| Fax | (337) 583-2063 |
| Address | P. O. Box 167 |
| City | Sulphur |
| State | LA |
| Zip | 70663 |

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.

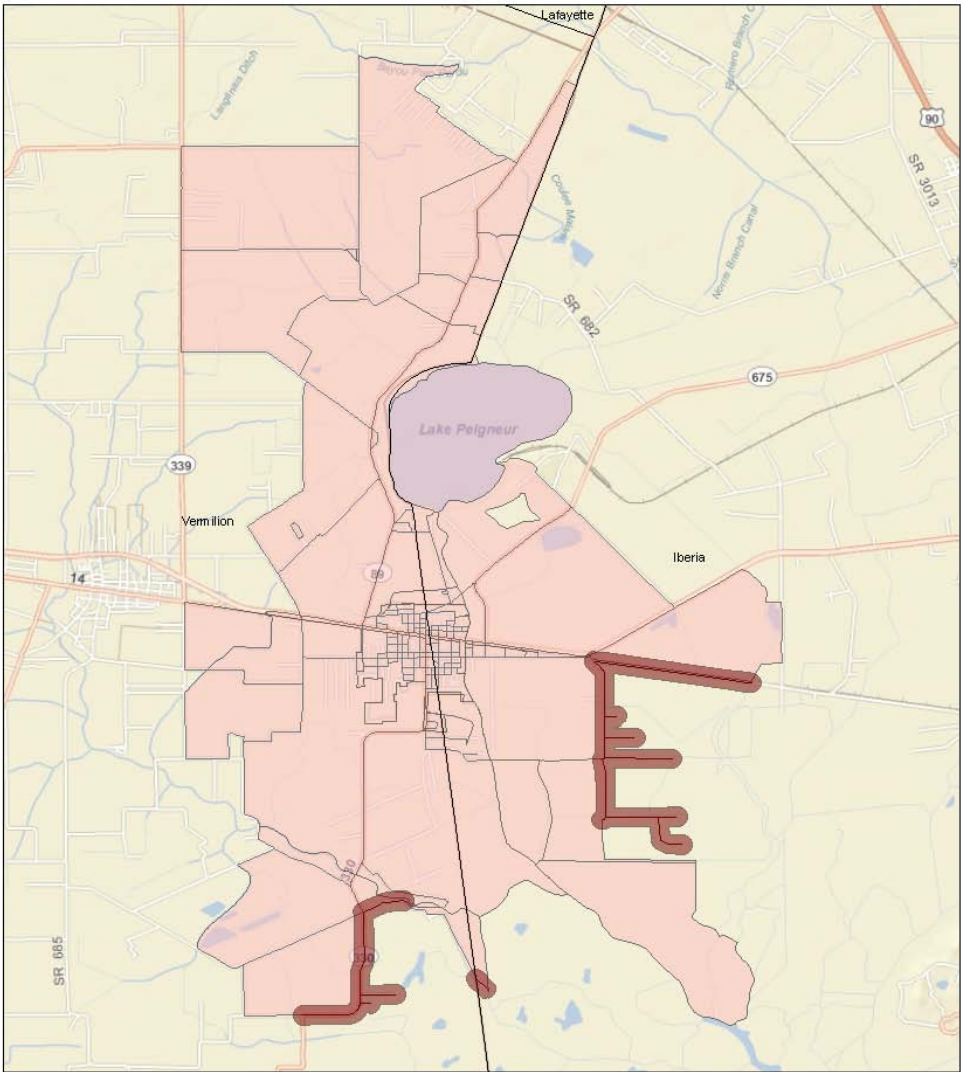
Detailed Verification Maps

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



Delcambre Telephone Co., LLC
Census Blocks / Road Segments Coverage
Asymmetric xDSL

Road Segment Coverage as depicted on broadband maps is defined as a 500 foot buffer around existing roads in census blocks greater than 2 square miles in area. Unnamed & other lesser roads may not be shown on the maps. Absence of road features does not necessarily indicate broadband service is unavailable.

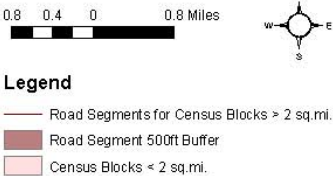


Figure 4 Provider Map

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
- census 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.

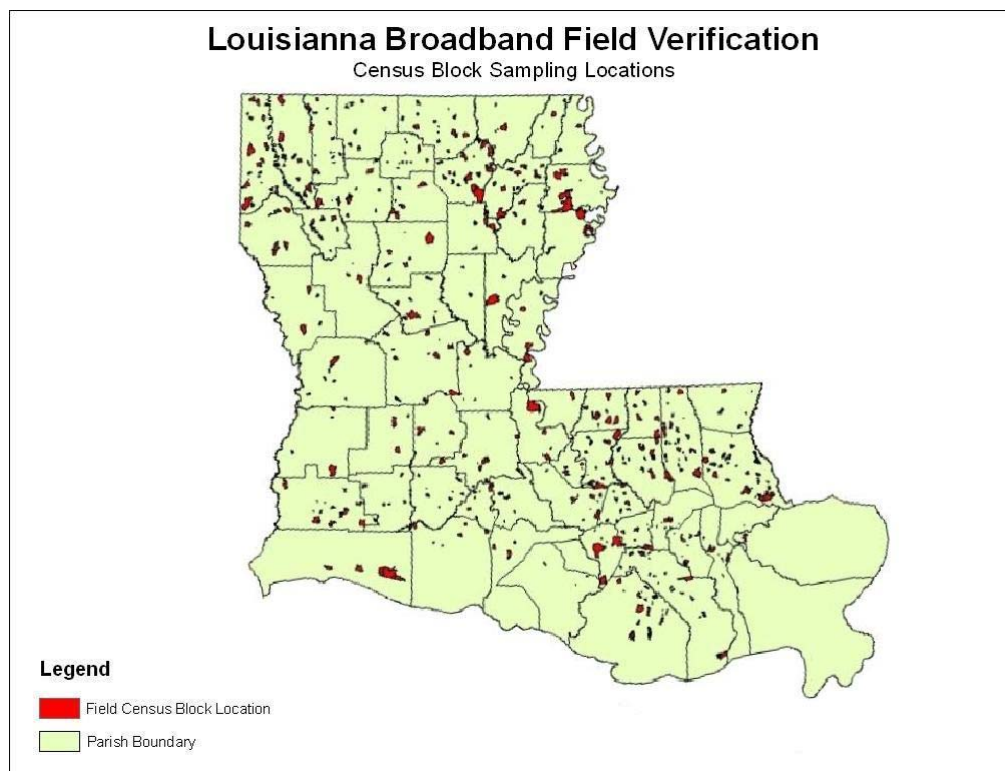


Figure 5 Field Verification Sampling Locations

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... |  |

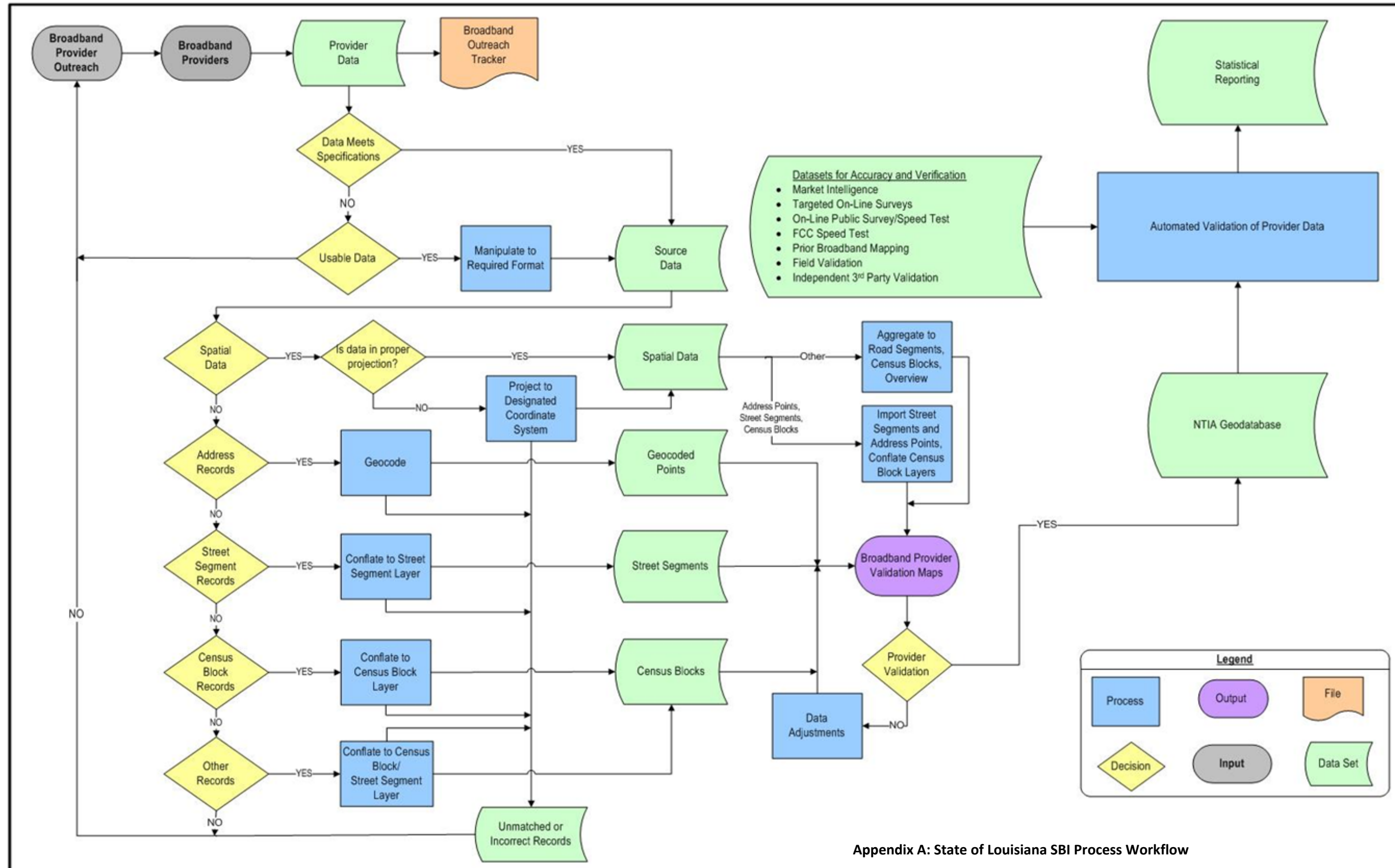
The matched percentage for the records for each provider are summarized and then divided by the total count of the records to create the final matched percentage for the specific provider. These percentages are included in DataPackage.xls on the Provider Table tab in the Comments column.

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.

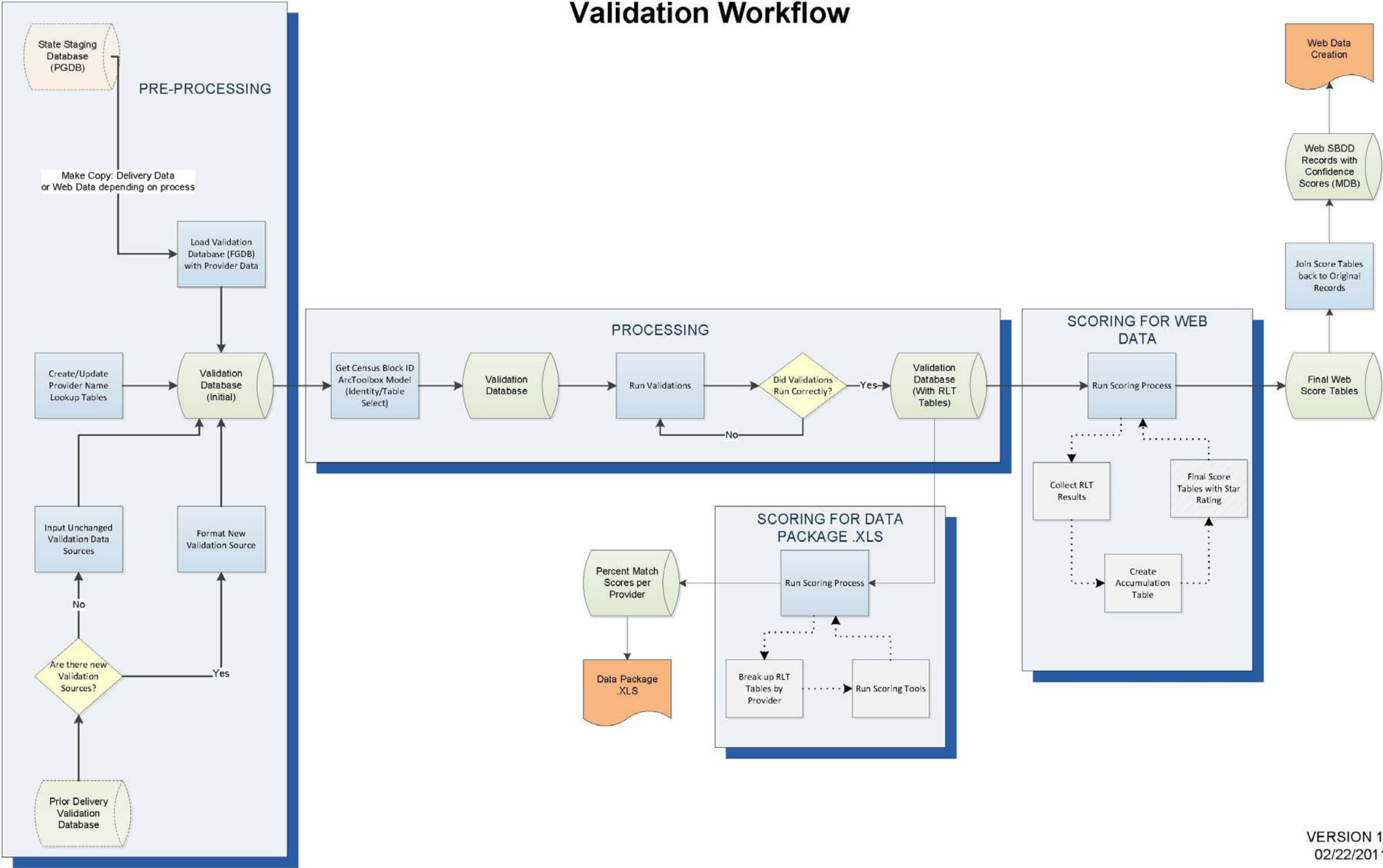
Changes and Corrections Documentation

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



Appendix C: Master Outreach List

| Filing Company DBA | Filing Company Name | Status |
|-------------------------------------------|-------------------------------------------|------------------------------------------------|
| 360networks | 360networks | Not a Broadband Provider or Reseller |
| Acadiana Wireless | Acadiana Wireless | Provider |
| Access One Communications | The Other Phone Company, Inc. | Not a Broadband Provider or Reseller |
| Access Point, Inc. | Access Point, Inc. | Reseller |
| AccessCom, Inc. | AccessCom, Inc. | Not a Broadband Provider or Reseller |
| AllensTV | AllensTV | Provider |
| Alliance Communications Network | | Potential |
| Alltel Corporation | | Affiliate of Verizon |
| American Warrior Network | Communication Construction Services | Provider |
| Americatel | | Affiliate to Impact Telecom |
| Angles Communication Solutions | BLC Management LLC of Tennessee | Not a Broadband Provider or Reseller |
| AT&T Corp, Inc. | AT&T Corp, Inc. | Provider |
| AT&T Corp, Inc. | BellSouth Telecommunications, 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 |
| Bayou Cable Inc | Bayou Cable Inc. | Provider |
| Bayou Internet Inc. | | Affiliate of Integrated Data Systems |
| Birch Communications | Birch Communications | Reseller |
| Bluebird Wireless Broadband Services, LLC | Bluebird Wireless Broadband Services, LLC | Provider |
| Broadband IP | Interactive E-Solutions | Provider |
| Broadcore, Inc. | | Not a Broadband Provider or Reseller |
| BroadPoint, Inc. | BroadPoint, Inc. | Not a Broadband Provider or Reseller |
| Broadview Networks Holdings, Inc. | | Potential |
| Broadvox, LLC | Broadvox, LLC | Potential |
| Buford Media Group | Buford Media Group | Provider |
| BullsEye Telecom, Inc. | BullsEye Telecom, Inc. | Reseller |
| C Spire Wireless | | Provider |
| Cable ONE | Cable One | Provider |
| Cajun.net | | Affiliate to Computer Sales and Services, Inc. |
| Cameron Communications | Cameron Telephone Company, LLC | Provider |
| Cameron Communications | Elizabeth Telephone Company, LLC | Provider |
| Cameron Communications | LBH, LLC | Provider |
| Campti Pleasant Hill Telephone Company | Campti Pleasant Hill Telephone Company | Provider |

| Filing Company DBA | Filing Company Name | Status |
|-----------------------------------------------|------------------------------------------|--------------------------------------|
| Catcomm Internet Services, LLC | Catcomm Internet Services, LLC | Potential |
| Cavalier Business Communications | Network Telephone Corp. | Reseller |
| Cavalier Telephone and TV | Talk America Inc. | Reseller |
| CenturyLink | CenturyTel, Inc. | Provider |
| Charter Communications Inc. | Charter Communciations Inc. | 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 |
| Command Connect, LLC | | Affiliate of Cameron Communications |
| Computer Sales & Services, Inc. | Computer Sales & Services, Inc. | Provider |
| COMTECH 21, LLC | COMTECH 21, LLC | Reseller |
| Cox Communications | CoxCom Inc. | Provider |
| CP-Tel Network Services | CP-Tel Network Services | Provider |
| Crawfish Net/WorldPace Internet | | Not a Broadband Provider or Reseller |
| Cricket Communications, Inc. | Leap Wireless International, Inc. | Provider |
| CS Wireless LLC | CS Wireless LLC | Not a Broadband Provider or Reseller |
| Cypress Communications Operating Company, LLC | | Affiliate of Broadvox Communications |
| Delcambre Telephone Co., LLC | Delcambre Telephone Co., LLC | Provider |
| DeltaCom, Inc. | DeltaCom, Inc. | Reseller |
| DETEL | Conterra Broadband Services | Provider |
| DSLnet Communications, LLC | | Affiliate of MegaPath |
| East Ascension Telephone Company LLC | EatelCorp Inc | Provider |
| ERF Wireless, Inc. | ERF Wireless, Inc. | Not a Broadband Provider or Reseller |
| Ernest Communications, Inc. | Ernest Communications, Inc. | Not a Broadband Provider or Reseller |
| Etex Communications | | Not a Broadband Provider or Reseller |
| Evdo DepotUSA | | Not a Broadband Provider or Reseller |
| EZNETLA, L.L.C. | EZNETLA, L.L.C. | Not a Broadband Provider or Reseller |
| Fidelity Communications | Cobridge Broadband | Provider |
| First Choice Technology of Louisiana, LLC | | Not a Broadband Provider or Reseller |
| Freedom Communications USA, LLC | Tennessee Telephone Service, LLC | Reseller |
| Fulair Wireless | Fulair Wireless | Provider |
| Galaxy Cablevision | Galaxy Cablevision | Not a Broadband Provider or Reseller |
| Global Crossing Telecommunications, Inc. | Global Crossing Telecommunications, Inc. | Not a Broadband Provider or Reseller |
| Ground Control Systems, Inc. | Ground Control Systems, Inc. | Not a Broadband Provider or Reseller |
| Gulf Coast Broadband | Gulf Coast Broadband | Not a Broadband Provider or Reseller |
| Gulf Fiber | | Not a Broadband Provider or Reseller |
| Harbor Communications, LLC | Harbor Communications, LLC | Provider |

| Filing Company DBA | Filing Company Name | Status |
|-------------------------------------------------|-------------------------------------------------|--------------------------------------|
| HughesNet | Hughes Communications, Inc. | Provider |
| Hunt Telecom | Hunt Telecom | Potential |
| Insight Louisiana | | Not a Broadband Provider or Reseller |
| Integrated Data Systems | Integrated Data Systems | Potential |
| Interlink Communications Partners LLC | | Affiliate of Charter Communications |
| Kayse Wireless | Kayse Wireless | Provider |
| Kinetix Technologies | Kinetix Broadband, LLC | Provider |
| Kricket Internet Services | Kricket Internet Services | Potential |
| KTC PACE | Kaplan Telephone Co., Inc. | Provider |
| Level 3 Communications, LLC | Level 3 Communications, LLC | Provider |
| LightEdge Solutions, Inc. | LightEdge Solutions, Inc. | Not a Broadband Provider or Reseller |
| LocalUSA | LocalUSA | Not a Broadband Provider or Reseller |
| Louisiana Unwired, LLC | Part of Sprint | Affiliate of Sprint |
| LUS Fiber | Lafayette City-Parish Consolidated Government | Provider |
| Matrix Telecom, Inc | | Affiliate of Impact Telecom |
| Maximum Access, LLC | Maximum Access, LLC | Potential |
| McGraw Communications, Inc. | McGraw Communications, Inc. | Not a Broadband Provider or Reseller |
| Media III | CableSouth Media III, LLC | Provider |
| MediaCom | | Affiliate of Mediastream |
| Mediastream | James Cable | Provider |
| Megapath | MegaPath Corporation | Provider |
| Meriplex Communications, Ltd. | Meriplex Communications, Ltd. | Reseller |
| Metro PCS | | Not a Broadband Provider or Reseller |
| Metropolitan Telecommunications Holding Company | Metropolitan Telecommunications Holding Company | Reseller |
| Mexicall Communications | BLC Management LLC of Tennessee | Not a Broadband Provider or Reseller |
| Mitel NetSolutions, Inc. | Mitel NetSolutions, Inc. | Not a Broadband Provider or Reseller |
| Network USA, LLC | Network USA, LLC | Not a Broadband Provider or Reseller |
| New Edge Network, Inc. | New Edge Network, Inc. | Reseller |
| Newbreak Communications | | Provider |
| NextGen Communications, Inc. | NextGen Communications, Inc. | Not a Broadband Provider or Reseller |
| Nexus Systems, Inc. | Nexus Systems, Inc. | Provider |
| NORTHEAST LOUISIANA TELEPHONE CO., INC. | NORTHEAST LOUISIANA TELEPHONE CO., INC. | Provider |
| NTS Communications, Inc. | Xfone USA, Inc. | Provider |
| NuVox, Inc. | NuVox, Inc. | Reseller |
| PAETEC | US LEC Communications Inc. | Not a Broadband Provider or Reseller |
| PC One Cable LLC | PC One Cable LLC | Not a Broadband Provider or Reseller |
| Petrocom License Corporation | | Not a Broadband Provider or Reseller |

| Filing Company DBA | Filing Company Name | Status |
|------------------------------------|------------------------------------------------|------------------------------------------------|
| Plaquemines Cablevision | | Affiliate of Etan Industries, Inc. |
| Pleasant Vision, Inc. | Pleasant Vision, Inc. | Not a Broadband Provider or Reseller |
| Public Service Communications, LLC | Public Service Communications, LLC | Not a Broadband Provider or Reseller |
| Qualcomm Incorporated | Qualcomm Incorporated | Not a Broadband Provider or Reseller |
| Qwest Communications Company, LLC | Qwest Communications Company, LLC | Not a Broadband Provider or Reseller |
| Radio Communications Service | Gonthier, Inc. | Provider |
| Red River Cable TV Co, Inc. | Red River Cable TV Co, Inc. | Not a Broadband Provider or Reseller |
| Reserve Telecommunications | Reserve Long Distance Co. | Provider |
| Service One Cable TV | Service One Cable TV | Not a Broadband Provider or Reseller |
| SignalPoint Communications, Inc. | | Not a Broadband Provider or Reseller |
| Skycasters | Skycasters, LLC | Provider |
| Skycom1 | Skycom1 | Potential |
| SkyRider Communications, Inc. | | Potential |
| Southern Light of Louisiana, LLC | Southern Light of Louisiana, LLC | Not a Broadband Provider or Reseller |
| Spillway Communications Inc. | Spillway Communications Inc. | Provider |
| Sprint | Sprint Nextel Corporation | Provider |
| Squire Creek Communications (SSL) | Squire Creek Communications (SSL) | Provider |
| Star Communications | Star Telephone Company, Inc. | Provider |
| StarBand Communications Inc. | StarBand Communications Inc. | Provider |
| Stratos Offshore Service Company | | Not a Broadband Provider or Reseller |
| Suddenlink Communications | Cebridge Acquisition, LP | Provider |
| Suddenlink Communications | Cequel III Communications I, LLC | Provider |
| Suddenlink Communications | Classic Cable of Louisiana, LLC | Provider |
| Superior Wireless | Superior Wireless | Potential |
| TEC of Jackson, Inc. | TEC of Jackson, Inc. | Reseller |
| TeleConex, Inc. | TeleConex, Inc. | Not a Broadband Provider or Reseller |
| Telefonica USA, Inc. | Telefonica USA, Inc. | Reseller |
| Telepak Networks, Inc. | Telepak Networks, Inc. | Not a Broadband Provider or Reseller |
| The Bayou Telephone Company, Inc | | Affiliate to Hunt Telcom |
| T-Mobile | T-Mobile USA, Inc. | Provider |
| Toly Digital Netowrks, Inc. | Toly Digital Netowrks, Inc. | Not a Broadband Provider or Reseller |
| TriParish.net | | Affiliate of Computer Sales and Services, Inc. |
| Trust Cable | | Affiliate of Bailey Cable |
| tw telecom of louisiana llc | tw telecom of louisiana llc | Provider |
| TX-11 Newco LLC | | Not a Broadband Provider or Reseller |
| Verizon Business | Verizon Business Global LLC | Not a Broadband Provider or Reseller |
| Verizon Wireless | Cellco Partnership and its Affiliated Entities | Provider |
| ViaSat, Inc. | ViaSat | Provider |



| Filing Company DBA | Filing Company Name | Status |
|----------------------------------|----------------------------------|--------------------------------------|
| Vision Communications | SJI, LLC | Provider |
| Vision Communications | Vision Communications, LLC | Provider |
| Wave2Wave Communications | Wave2Wave Communications, Inc. | Not a Broadband Provider or Reseller |
| Windstream | | Not a Broadband Provider or Reseller |
| Wirelessco, L.P. | | Affiliate of Sprint |
| Wow Technologies, Inc. | Wow Technologies, Inc. | Not a Broadband Provider or Reseller |
| XO Communications Services, Inc. | XO Communications Services, Inc. | Potential |
| XPANCE Broadband, Ltd | XPANCE Broadband, Ltd | Reseller |