OFFICIAL APRIL 2012 UPDATE SUBMISSION TO THE NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION UNDER THE STATE BROADBAND INITIATIVE GRANT PROGRAM FOR THE COMMONWEALTH OF PUERTO RICO

April 1, 2012

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COVER LETTER

April 1, 2012

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:

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.

It is with highest regard that the collective stakeholders of Connect Puerto Rico offer congratulations to the U.S. Department of Commerce's National Telecommunications and Information Administration (NTIA) on the one-year anniversary of the release of the National Broadband Map. This extraordinary milestone demonstrates the ongoing intense and joint effort of the NTIA, FCC, state governments, industry, and non-profits like Connected Nation as it continues to serve as a key tool for the American public and policymakers, resulting in smarter investments and targeted state and local broadband policies and programs. We are proud of the role that Connect Puerto Rico has played in creating and maintaining such a powerful tool that has benefitted and surely will continue to benefit not just Puerto Ricans, but consumers and businesses nationwide.

These artifacts should be found to be compliant with the April 1, 2012, 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 Puerto Rico: April 1, 2012

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 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 2011 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, 2012, is contained within the SBI Data Transfer Model as released on the Grantee Workspace on January 17, 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
This submission continues to follow the speed technology guidance released by the Program Office on December 22, 2011, to review speed tier codes in correspondence with technology of transmission codes. In the October 2011 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 2012 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

This data update submission under the SBI program includes datasets for approximately 84.21 percent of the Puerto Rico provider community, or 16 of 19 total providers. There are 15 participating providers and 1 additional non-participating provider whose estimated coverage areas have been submitted. Of the 15 participating providers, 11 supplied an update to their network or coverage area(s), while 3 have reported no change. The remaining provider previously supplied data but was non-responsive in the April 2012 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 record is contained herein. The 3 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, 13 (65.00 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 3,844 unique visits during this reporting period, (12,922 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 (71 grant inception to date). The website also provides the BroadbandStat application, which allows the consumer 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 (BroadbandStat) that offer the citizens 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 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.

In conjunction with the Office of Chief Information Officer, 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. Connect Puerto Rico worked with the Office of Chief Information Officer, the Puerto Rico Health Information Network, the Department of Education, and The CSA Group to capture CAI data and to promote the importance of broadband connectivity at anchor institutions and participation in this data collection process. Connect Puerto Rico will continue to build upon these 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 territories through contribution to the National Broadband Map. We look forward to the continuing work ahead.

Respectfully submitted,

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

cc: Juan Eugenio Rodriguez de Hostos
Chief Information Officer
Government of Puerto Rico

DATA ACQUISITION: PUERTO RICO COMMUNITY ANCHOR INSTITUTIONS METHODOLOGY

In this fifth reporting period of the SBI, Connect Puerto Rico, working in close coordination with the Commonwealth of Puerto Rico, 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. During this reporting period Connect Puerto Rico has continued to focus efforts on conducting outreach and raising awareness of this important project.

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 island as well as organizations and agencies that work closely with the CAI. 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.

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 commonwealth 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. Connect Puerto Rico worked with the Puerto Rico Office of the Chief Information Officer, the Puerto Rico Health Information Network, the Department of Education, and the CSA Group to capture CAI data.

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 CAI 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 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:

CAI Type	Total	Physical Address	Lat/Long	Technology of Transmission	Download Speed	Upload Speed
K-12 Schools	2026	2023	1726	1544	1505	1504
Libraries	155	154	153	3	2	2
Healthcare	622	621	139	0	0	0
Public Safety	305	304	277	21	17	11
Higher Ed Institutions	549	549	88	21	16	16
Other Government	129	129	122	0	59	45
Other Non-Government	1594	1532	979	8	5	5
Total	**5380**	**5312**	**3484**	**1597**	**1604**	**1583**

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.

SBI Data Submission Methodology

The submission of the broadband dataset for April 1, 2012, is contained within the SBI Data Transfer Model and additional components as released on the Grantee Workspace on January 17, 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. Guidance from the Technical Mapping Guide, as released on the Grantee Workspace on March 24, 2011, was also 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.

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 Commonwealth of Puerto Rico.

Inventory of Deliverables, Connect Puerto Rico: April 1, 2012

NOFA Requirement	Data Transfer Model	Data Description
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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 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 island 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 is underway at CN 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 and 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 state 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: Areonet Wireless; AT&T, Inc.; Choice Communications; Critical Hub Networks; Data@ccess; Liberty Cablevision of Puerto Rico Ltd.; Neptuno Media; OneLink; PR Wireless, Inc.; Puerto Rico Telephone Company; Sprint Nextel Corporation; T-Mobile; and Worldnet.

From program initiation through this reporting period, CN has completed in-the-field validation testing against 13 companies (out of a universe of 20 viable providers) totaling 65.00 percent within the Commonwealth of Puerto Rico. This percentage also considers the Non-Participating provider (NPP) 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. 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.

Critical Hub Networks
Issue: Fixed wireless platform with maximum advertised download speed in tier 7, higher than the expected value range for the technology.
Resolution: Provider website advertises 10 Mbps service; screenshot below.

Pricing - Residential

Plans	Download Speed
NetSpeed One	1M
NetSpeed Two	2M
NetSpeed Five	5M
NetSpeed Ten	10M

Liberty Global, Inc.
Issue: Technology of transmission 40 with maximum advertised download speed in tier 8, lower than the expected value range for the technology.
Resolution: Provider website advertises 30 Mbps service; screenshot below.

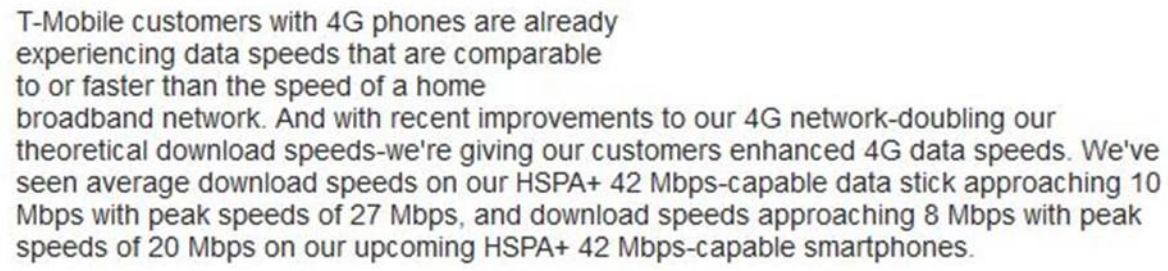
Our Internet service sets the bar for high speed web access in Puerto Rico. If you're looking for speed and reliability, you got it. We offer you the highest speeds at the lowest prices, guaranteed. The stats prove it! You don't need to install a phone line you don't use. The equipment cost is included. Plus, if you bundle it up with our TV and phone services, it costs even less!

3 Mbps	Triple Pack $29.99 – Individual $39.99 Monthly	Up to 5 times faster than most, plus, you get aditional features for FREE!	Show me more Details
5 Mbps	Triple Pack $34.99 – Individual $44.99 Monthly	Increase your speed and save an average of $40 compared to the competition.	Show me more Details
10 Mbps	Triple Pack $44.99 – Individual $64.99 Monthly	Rev it up! The only place where you can get this much speed without breaking the bank.	Show me more Details
20 Mbps	Triple Pack $54.99 – Individual $74.99 Monthly	Do evething you love to do online all at once and faster than ever.	Show me more Details
30 Mbps	Triple Pack $64.99 – Individual $84.99 Monthly	All your household divices connected and at full speed.	Show me more Details

Puerto Rico Telephone Company Inc.
Issue: DSL platform with maximum advertised download speed in tier 7, higher than the expected value range for the technology.
Resolution: Provider website advertises 16 Mbps service; screenshot below.

Planes de Internet 16 Mega

T-Mobile USA, Inc.
Issue: Mobile wireless platform with maximum advertised download speed in tier 7, higher than the expected value range for the technology.
Resolution: Provider website indicates speeds greater than tier 6 are available; screenshot below.


T-Mobile customers with 4G phones are already experiencing data speeds that are comparable to or faster than the speed of a home broadband network. And with recent improvements to our 4G network-doubling our theoretical download speeds-we're giving our customers enhanced 4G data speeds. We've seen average download speeds on our HSPA+ 42 Mbps-capable data stick approaching 10 Mbps with peak speeds of 27 Mbps, and download speeds approaching 8 Mbps with peak speeds of 20 Mbps on our upcoming HSPA+ 42 Mbps-capable smartphones.

DATA SUBMISSION AND COVERAGE ESTIMATION OF NON-PARTICIPATING PROVIDER

San Juan Cable, LLC (d.b.a. OneLink)

As part of its ongoing broadband mapping efforts, Connected Nation 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 SBI mapping initiative.

The following narrative will discuss the recent data collection activities related to San Juan Cable, LLC (d.b.a. OneLink), a cable television and cable modem provider in the San Juan, Puerto Rico area, explaining how and where CN obtained publicly available data and the on-the-ground validation techniques that support the underlying data.

Background
CN staff members attended meetings in Puerto Rico from September 21-25, 2009, for a series of one-on-one provider meetings, which had been scheduled by Maria Pou, Special Assistant to the OCIO, to discuss the SBI grant program. OneLink was scheduled to attend a meeting on September 24 at 10 a.m.; however, no one from the organization arrived (nor did they notify Maria

of their intent to cancel). Outreach efforts conducted from September 2009 through July 2011 have failed to motivate OneLink into either responding or participating in the mapping initiative.

The Issue

OneLink, by its lack of actions, indicated its unwillingness to participate in the island-wide mapping initiative. This surfaced as a problem during the first two stages of mapping; the lack of data for this provider will continue to threaten to skew future research and planning activities under the direction of the OCIO.

Identification of Provider's Legal Name, d.b.a., and FRN

CN began building a file based on anecdotal information and, as time progressed, enriched the file with information obtained through the public domain. For example, CN received information from the Junta Reglamentadora de Telecomunicaciones de Puerto Rico ("JRT") indicating that territory once operated by Adelphia was the same territory now operated by OneLink. A search for a Federal Registration Number ("FRN") on the FCC **CO**mmission **RE**gistration **S**ystem ("CORES") system did not yield results. It was later discovered that the entity of record with the JRT was, in fact, San Juan Cable, LLC. A new search on the FCC CORES site yielded an FRN of 0013778857**(Exhibit A)** and additional contact data. This was later confirmed when NTIA provided CN with a submission summary comparison against FCC Form 477 filers **(Exhibit B)**.

Exhibit A: FRN

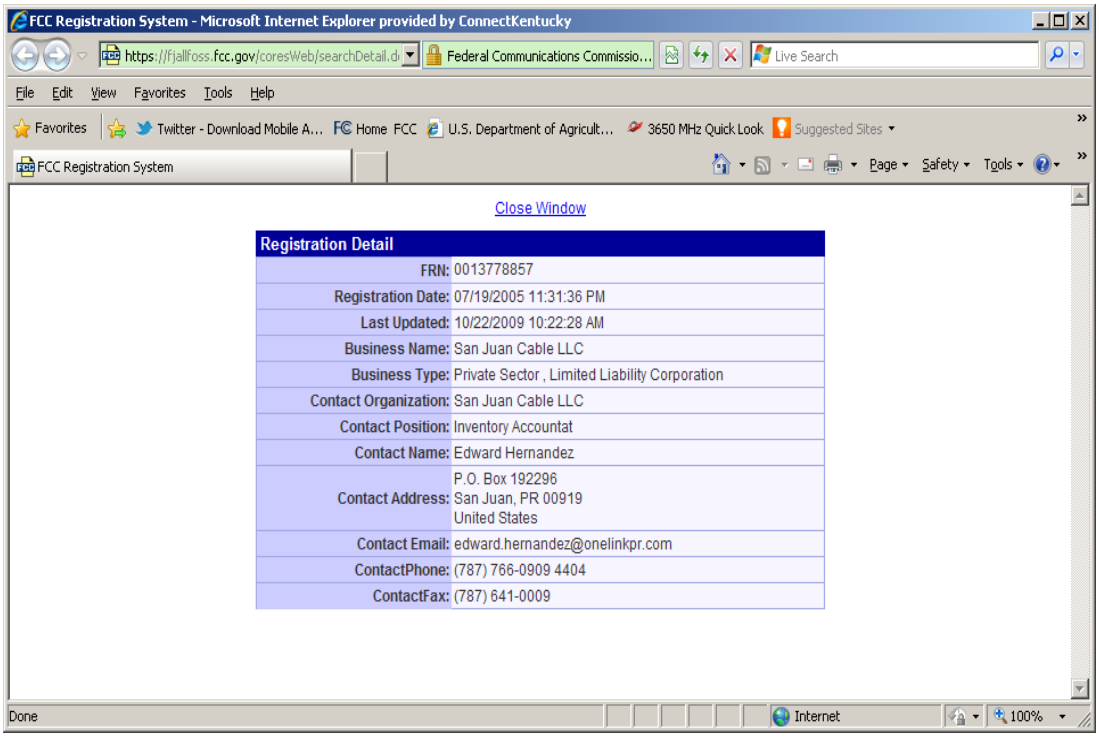


Exhibit B: SBBD Form 477 Reference

State Broadband Data and Development (SBDD) Program
Submission Summary
Date: 6/25/2010

Puerto Rico

Service Providers Submitted *

* Based on data from Census Block (2 Sq. Miles, Address-Level, Street Segment, Residential Overview Files, Wireless Shape Files

State Broadband Data Submission				FCC Form 477 (June 2009)		
FRN	Company Name	Doing Business As	#	FRN	Company Name	Doing Business As
4979233	AT&T Mobility LLC	AT&T Mobility LLC	1	0003756532	AT&T Inc.	New Cingular Wireless Services, Inc.
0017314701	America Movil	Puerto Rico Telephone Company, Inc.	2	0004496774	AT&T Inc.	AT&T Corp.
0017434911	Hughes Network Systems, LLC	Hughes Network Systems, LLC	3	0001731470	Am□rica M□vil	Puerto Rico Telephone Company, Inc.
0010593408	Liberty Global, Inc.	Liberty Cablevision of Puerto Rico Ltd.	4	0012216933	Am□rica M□vil	Telecomunicaciones de Puerto Rico, Inc.
0003774593	Sprint Nextel Corporation	Sprint	5	0009631136	Centennial Communications Corpor	Centennial Communications Corp.
			6	0018483073	Hughes Communications, Inc.	HNS License Sub, LLC
			7	0010593408	Liberty Global, Inc.	Liberty Cablevision of Puerto Rico Ltd.
			8	0012841458	Neptuno Media, Inc.	Neptuno Media
			9	0003405963	Qwest Communications Internation	Qwest Communications Company, LLC
			10	0013778557	San Juan Cable Holding, LLC	San Juan Cable LLC
			11	0003774593	Sprint Nextel Corporation	Sprint Nextel Corporation
			12	0005057457	StarBand Communications Inc.	StarBand Communications Inc.
			13	0018547828	Telefonica Data Corp SA	Telefonica USA, Inc.
			14	0018547885	Telefonica International Holding, BV	Telefonica Larga Distancia de Puerto Rico, In
			15	0018591826	Worldnet Telecommunications, Inc.	WORLDNET TELECOMMUNICATIONS

Identification of Provider's Coverage Area

Connected Nation extracted the municipality boundaries from OneLink's publicly available website **(Exhibit C)** and used the company's published boundaries to create a GIS shapefile **(Exhibit D)** of the greatest advertised extent of OneLink's service area.

Exhibit C: Municipal Boundaries

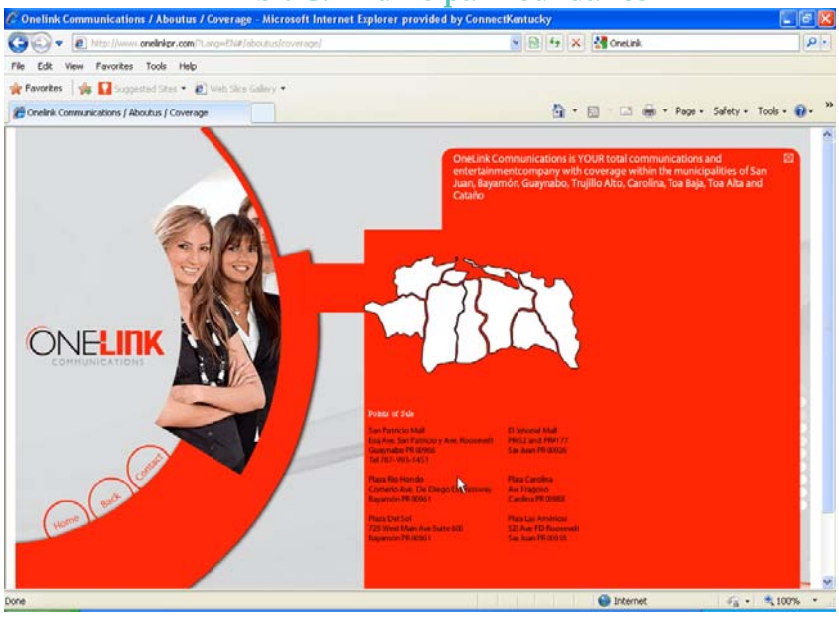
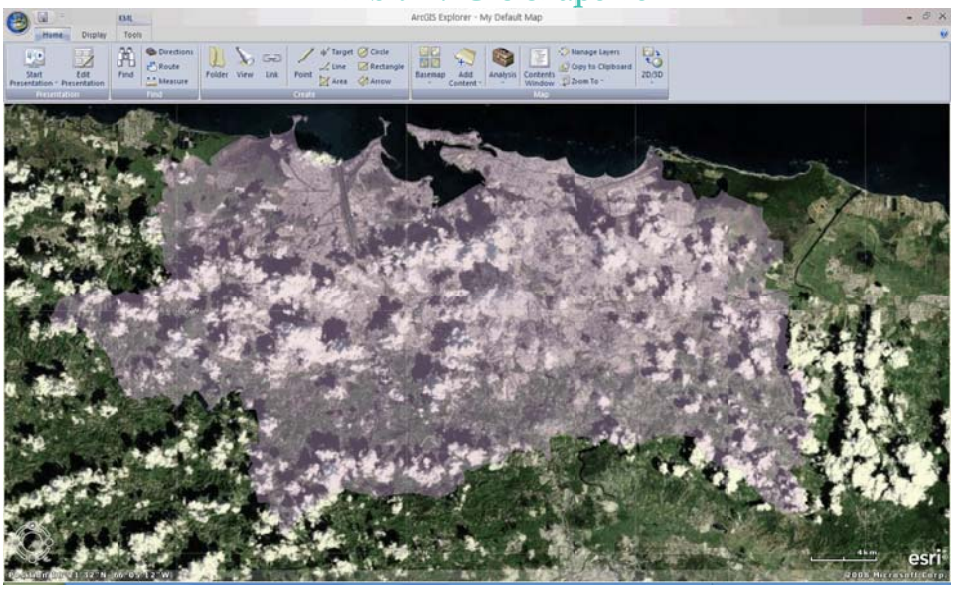
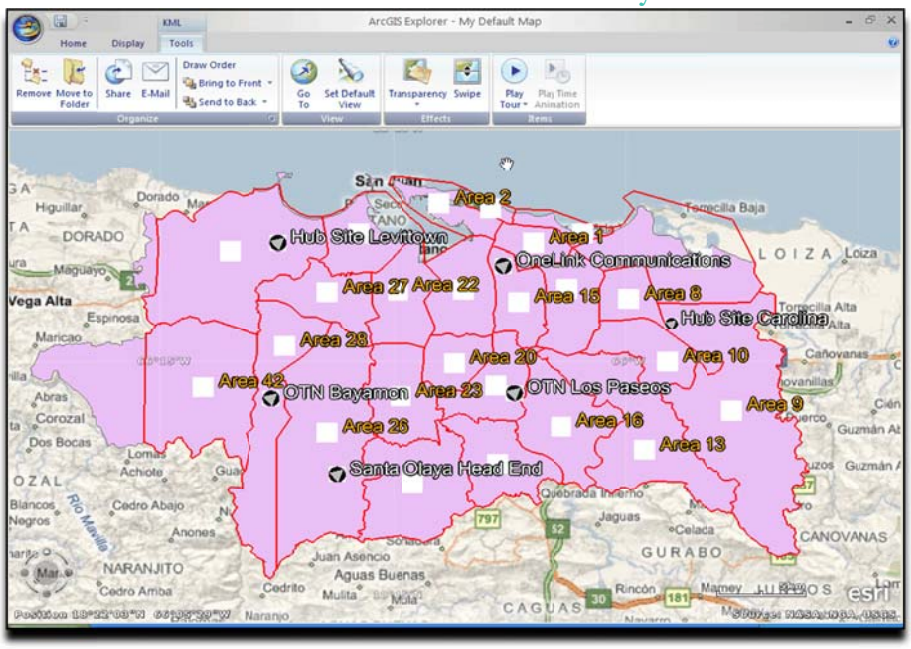


Exhibit D: GIS Shapefile



These polygons were then compared against *the only* data supplied by OneLink during the course of attempted communication **(Exhibit E)**. The purple-shaded area was the CN coverage polygon extracted from OneLink's website, and the red outlines illustrate the franchisee boundaries submitted by OneLink.

Exhibit E: OneLink Franchise Boundary Submission

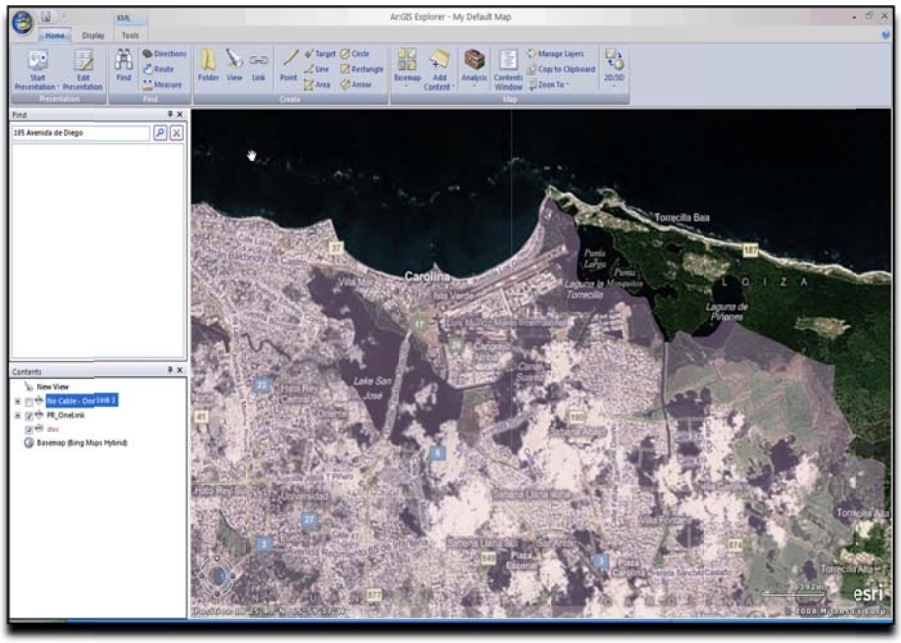


Using this combined coverage polygon as the basis for further investigation, Connected Nation set out on an exploratory "drive test" to determine where cable plant existed and estimate where cable modem likely existed in the greater San Juan area. During the period of February 7-11, 2011, Connected Nation deployed five staff members (all highly trained, former telecommunications operators) to conduct a thorough analysis of OneLink's alleged coverage area.

Testing Techniques

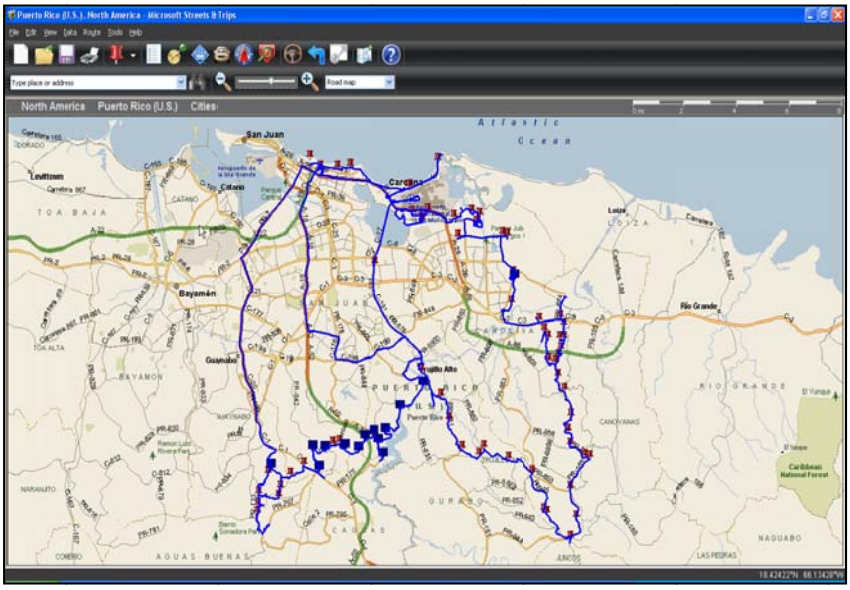
Specific quadrants **(Exhibit F)** were assigned to each of the validation teams on a daily basis. The goal was to drive through each of the areas and determine the existence (or lack thereof) of CATV plant – whether fiber or coaxial.

Exhibit F: Sample Quadrant



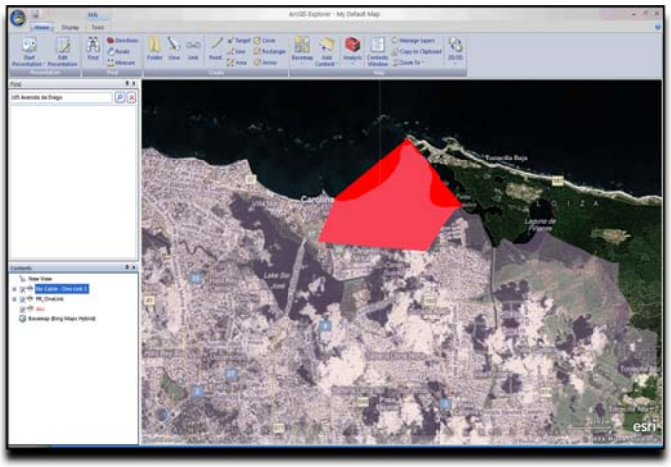
Test points were pre-selected and entered into Microsoft's *Streets & Trips* software **(Exhibit G)**, which also created a GPS-enabled "trace route" of each day's drive testing activities. As cable plant was identified, markers were placed within *Streets & Trips*, pinpointing the areas where service was likely to exist. Connected Nation staff members then proceeded to stop at points along the way and conducted random interviews with residents within the area querying the actual availability of cable modem service.

Exhibit G: Test Point Locations



Based on the lack of visible or traceable cable plant, polygons were created in ArcGIS Explorer to specify the population areas where the Connected Nation staff believed coverage gaps existed. The illustration below **(Exhibit H)** represents one such gap area identified during the drive test.

Exhibit H: Coverage Gap Polygon



Visual identification of physical CATV plant **(Exhibit I)** was relatively easy and straightforward. The Connected Nation team members, many of whom were former CATV operators, found very little difficulty in identifying aerial (above ground) CATV plant or in locating plant that traveled below the earth's surface (underground plant) based simply on looking for specific cable routes.

Exhibit I: OneLink Service Truck

The images below demonstrates that the Connected Nation team could, in fact, locate aerial plant **(Exhibit J)** and identify CATV plant moving from a pole to an area where underground vaults or above-ground pedestals **(Exhibit K)** were easily traced and identified.

Exhibit J: Aerial Plant

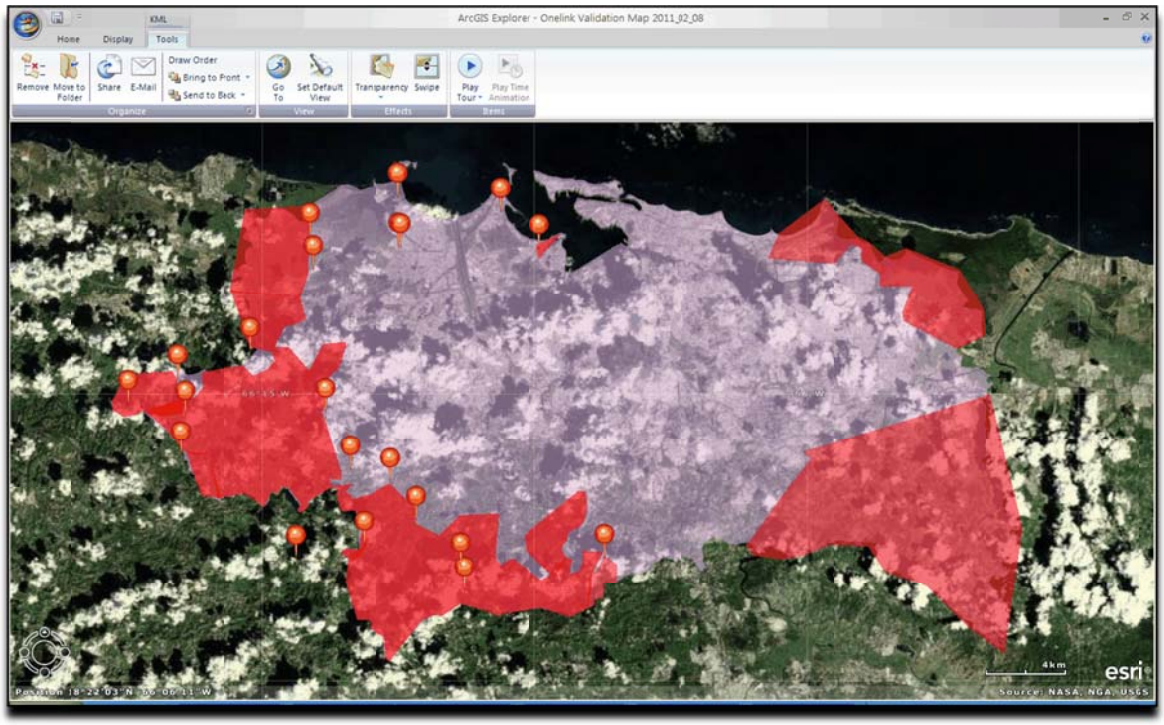
Exhibit K: Above Ground Pedestal

At the conclusion of this week-long exercise, Connected Nation had driven through several hundred miles of the OneLink franchise area, located above-ground and underground plant, visited with and surveyed numerous local residents, obtained collateral material from OneLink's local offices (to determine maximum advertised connection speeds), and created a polygon that illustrates the identified and likely coverage area of OneLink.

Results and Submission for April 2012

As a result of the collection of publicly available information and the on-the-ground validation efforts, Connected Nation is submitting on behalf of the Commonwealth of Puerto Rico, the cable modem broadband service area of OneLink. Without provider participation and support of the SBI mapping initiative, CN has proceeded with developing a relevant and feasible methodology for collecting and validating the service area of a currently non-participating broadband provider. The image below **(Exhibit L**) shows the exact results of the validation efforts in terms of the revisions made to the advertised cable broadband availability in the San Juan area. Polygons in red demonstrate areas where the CN staff reasonably believes "gaps" exist in the franchise area. The remaining purple-shaded areas are included, along with full attributes, in the Puerto Rico broadband data submission for the October 1, 2011, deliverable to NTIA for the SBI grant program.

Exhibit L: Validation Results



Sample OneLink Cable Modem Collateral Material

ACCURACY AND VERIFICATION: 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, BroadbandStat, 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, NPP 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 14.99 percent of Puerto Rico households do not have terrestrial fixed broadband service available, and approximately 0.57 percent[1] of Puerto Rico households have neither mobile nor fixed broadband service available.[2]

Within rural areas of the commonwealth, results derived from provider-validated data indicate that approximately 23.97 percent of rural Puerto Rico households do not have terrestrial fixed broadband service available, and approximately 0.86 percent[3] of rural Puerto Rico households have neither mobile nor fixed broadband service available.[4] Please note that the availability estimates presented are based on Census 2010 household information.

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). In the case of NPP documents, 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).

[1] In accordance with NTIA's definition of available broadband service as specified in the SBI NOFA, this estimate includes both terrestrial fixed *and* mobile broadband service, if the service offers download speeds of at least 768 Kbps and upload speeds greater than 200 Kbps.

[2] 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.

[3] See footnote 1.

[4] See footnote 2.

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. omni-directional, 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, hillshade, 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 three categories: 1) residents who do not have broadband but want it; 2) residents who have broadband but want a different provider; and 3) residents who do not have broadband, but the broadband inventory maps indicate that they do.

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 requested 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 other 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 18,000 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 a total of 9 inquiries (71 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.

BroadbandStat Methodology

BroadbandStat is an online, interactive mapping tool for viewing, analyzing, and validating broadband data. Developed through a partnership with ESRI, the market leader in geographic information system (GIS) software, BroadbandStat 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, BroadbandStat 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 education and population demographics, broadband availability, and research about the barriers to adoption.

New functionality in BroadbandStat allows the consumer to 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 BroadbandStat on September 17, 2010, and has received a total of 1,933 visits to date, of which 597 occurred this reporting period.

SPEED TEST METHODOLOGY

The 312 speed tests that are represented in the Connect Puerto Rico Speed Test Report during this reporting period (1,172 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 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 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 was 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 2012 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, 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	Bad 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; bad 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.	n/a	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, as well as being an independent pay phone provider (IPP) for the hospitality and tourism industries.
16	Datavos Corporation	www.datavos.com	Bad 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	Fibercrossing Corp.	www.fibercrossing.net	Went out of business in December of 2009.
20	Globalstar Caribbean, Ltd.	www.globalstarusa.com	Provider of satellite phones and SMS service.
21	Hibridos Telecommunications, Inc. (HIB)	n/a	Puerto Rico-based CLEC; refused to participate.
22	Humacao Payphone	n/a	Prepaid phone services and pay phone distributor.
23	IDT Puerto Rico Co.	www.idt.net	Resells local and long distance phone services.
24	Intellicall Operator Services, Inc.	www.intellicalloperatorservices.com	Outsourced service solutions and U.S. call center facilities.
25	Lightyear Alliance of Puerto Rico, LLC	www.lightyear.net	Nonfacilities-based general reseller.
26	MCI Communications Services, Inc.	n/a	Acquired by Verizon.
27	MCI International, Inc.	n/a	Acquired by Verizon.
28	MEG COMMUNICATION	n/a	No longer in business.
29	Metro Beeper, Inc.	www.metrobeeper.com	Paging company.
30	MG Communications	n/a	Prepaid phone services and pay phone distributor.
31	Network Communications International Corp.	www.ncic.com	Inmate telephone services, pay phone services, and directory assistance and reseller of prepaid minutes.

32	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, as well as being an independent pay phone provider (IPP) for the hospitality and tourism industries.
33	Neutral Tandem-Puerto Rico, LLC	www.neutraltandem.com	Provides tandem services for wholesale long distance, local transit and international long distance.
34	Next G Network of NY, Inc.	n/a	System integrator.
35	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.
36	Optivon Telecommunications Services, Inc.	www.optivonpr.com	Nonfacilities-based general reseller.
37	Pan American Telephone Co., PR, LLC	n/a	Hispanic-owned political consulting, public affairs, communications and business development firm on Long Island.
38	Payphone Telecom	n/a	Prepaid phone services and pay phone distributor.
39	Phoneworks, Inc.	n/a	Pay phone services and distributor.
40	PR Pronto Telecommunications Corp.	n/a	An international word-of-mouth marketing agency.
41	PR Wireless, Inc.	www.openmobilepr.com	General reseller of prepaid mobile (long distance and broadband).
42	Primus Telecommunications Group, Inc.	www.ptgi.com//docs/facts caribbean.html	Nonfacilities-based general reseller and CLEC.
43	Qwest Communications Company, LLC	n/a	Acquired by CenturyLink.
44	San Juan Gas Acquisition Corporation, (SAC)	n/a	Gas and propane company with offshore communications.

45	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.
46	T-Mobile Puerto Rico, LLC	n/a	Holding company for T-Mobile; registered with JRT.
47	Tricom USA, Inc.	www.tricomusa.net	Specializes in the installation of any voice, data, and fiber cabling, from new construction to additions.
48	Value Added Communications, Inc.	n/a	Inmate telephone services, pay phone services and directory assistance.
49	Verizon Wireless	n/a	Out-of-state provider.
50	VoiceLan Group, Corp.	www.voicelangroup.com	Bad URL; out of business.
51	VPNet, Inc.	www.vox-tel.com	Bad URL; out of business.
52	WorldNet Telecommunications	n/a	CLEC and holding company for Worldnet.
53	Xairnet Corp.	www.xairnet.com	Bad URL; out of business.

CONNECT PUERTO RICO

Broadband Provider Log

Complete	20
Non-Responsive/Refused	0
In Progress	5
Count of Datasets by Status	**25**
Total Unique Providers Represented	**20**

Provider Name	Platform	Status	NDA Execution Date	Notes
AT&T Mobility LLC	Mobile Wireless	Data Added to Statewide Inventory	12/16/2009	[MAR-16-12 Jess Cary] Change: Possible expansion. New coverage area provided.
Liberty Global, Inc.	Cable	Data Added to Statewide Inventory	10/19/2009	[MAR-16-12 Jess Cary] Change: Provider upgraded network speeds.
Puerto Rico Cable Acquisition Company, Inc.	Cable	Data Added to Statewide Inventory	9/27/2010	[MAR-16-12 Jess Cary] Change: Provider upgraded network speeds.
Puerto Rico Telephone Company Inc.	DSL	Data Added to Statewide Inventory	4/23/2010	[MAR-16-12 Jess Cary] Change: Provider expanded coverage area.
Puerto Rico Telephone Company Inc.	Mobile Wireless	Data Added to Statewide Inventory	4/23/2010	[MAR-16-12 Jess Cary] Change: Possible expansion. Provided updated coverage area.
Sprint Nextel Corporation	Mobile Wireless	Data Added to Statewide Inventory	1/14/2010	[MAR-16-12 Jess Cary] Change: Possible expansion. New coverage area created.
T-Mobile USA, Inc.	Mobile Wireless	Data Added to Statewide Inventory	1/8/2010	[MAR-12-12 Jess Cary] Change: Expanded coverage area.
Aeronet Wireless Broadband Corp.	Backhaul	Backhaul Provider Only Processing Complete		
Critical Hub Networks	Backhaul	Backhaul Provider Only Processing Complete	9/30/2010	
INTECO	Backhaul	Backhaul Provider Only Processing Complete	1/30/2012	
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	
Worldnet Telecommunications Inc.	Backhaul	Backhaul Provider Only Processing Complete	4/19/2010	
San Juan Cable Holding, LLC, OneLink Communications	Cable	No Update-Estimated Coverage Submitted for Non-Participating Provider		
Ayustar Corporation	Fixed Wireless	Approval for Update Not Received – Data Still Submitted	7/12/2010	[MAR-14-12 Jess Cary] Change: Two towers no longer in service.
Critical Hub Networks	Fixed Wireless	No Update to Provide	9/30/2010	
Data@ccess Communications	Backhaul	No Update to Provide	9/29/2009	
Hughes Network Systems, LLC	Satellite	No Update to Provide	2/5/2010	
PREPA Networks LLC	Backhaul	No Update to Provide	4/21/2010	
Neptuno Media, Inc.	Backhaul	No Update Provided - Use Last Submission Data	4/29/2010	
PR Wireless, Inc.	Mobile Wireless	Provider Gathering Data		
Aeronet Wireless Broadband Corp.	Fixed Wireless	Solicited Initial Data		